Graduation Process Book

International Fashion and Management
AMFI Graduation Project
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13 June, 2016
Graduation coaches
Ligia Hera
Jacqui Haker
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'No-one's doing the whole thing!'  
- Ed Gribbin

"3D makes double-digit impacts on the businesses it deals with,"  
- Asaf Landau

"The fastest way to get faster is to think about how you can develop in 3D,"  
- Darioush Nikpour

"There are companies out there who are using 3D virtual product development technologies purely for design; there are others who are using them purely for merchandising and line planning; others who are using them for product development, pattern making, and technical fit."
- Ed Gribbin

"That's where 3D comes into play. Once you've created that form once, you can re-purpose it season to season and create a whole new feel in seconds, not weeks or days."
- Steven Madge

"The capabilities are huge once you have a 3D asset,"  
- Asaf Landau

"The opportunity to speed product development cycles is tremendous."
- Ed Gribbin
1st GRADUATION MEETING
4th February 2016

Important phase as it underlines the entire project

Work out a clear starting point and end result that is to expect.
-> Structure, Plan of Approach

Formulate a clear Research Question + Sub-questions that underline the main/ sub-titles
Any process guiding/ project shaping decision I make needs to be justifiable.
Be clear about
- Research Question (starting point)
- Expected end result
- Area of Research
- Source of Research
- Research Techniques, Analysis, Structure and Methodology

The Answer of my research conducted can be a negative one.

2nd Phase: Process Book
Workbook that underlines & navigates my process and showcases the research done.
Gathered research data.
Primary Research only.

2nd Phase: Research Report
Outcome of conducted research and gathered data
Max. 15 Pages (15.000 words)
Literature Reference in Harvard Style (Secondary Research)

Personal Feedback from Coaches:
- Clarify what terms to use „efficiency/ effectiveness“ and state what I mean by that and how to approach, research and analyse.
- Clarify what do I mean by „Optimization“ (final Product)

Note:
Get in contact with Fred (Librarian)
Get in contact with Lisette Vonk i.e. (Research)
3D VIRTUAL PROTOTYPING SOFTWARE - footwear

7th February 2016

1. Autodesk
   from Concept to Production
2. Optitex
   Clients: Adidas
3. Romans CAD
4. Shoemaster
   Covers 5 ways of designing
   Transforming to development (pattern engineering software)
5. Zweave
6. Morph 3D/ Morph Magic
7. Gerber Technology
8. Bluewater Software
9. FreeForm®
10. Rhino
   Clients: Adidas
11. Alvanon Inc. (Size and fit expert)
12. Dassault Systèmes
13. Audaces
14. Grafis CAD Shoe Construction Software

Rhino software
BENEFITS OF 3D DIGITAL PROTOTYPING TO PLM - mindmap

7th February 2016

Quick and flexible prototype response on design ideas

Reduction on product lead-times

Time, cost and material efficient

Increase of prototype variations within design phase

Design flexibility and freedom

Potential increase for customer experiences

Creation of virtual products that customers love, in time to adjust collection - direct interaction with consumer

Advanced proposition towards upcoming innovative technologies, i.e. rapid 3D prototyping/product printing

Alterations of prototypes possible within minutes

Lean and sustainable product creation

Simple, direct and fast product communication

No global boundaries, globalized product creation

3D VIRTUAL PROTOTYPING ON PLM IN FOOTWEAR
What do I mean when talking about Impact and Opportunities of 3D digital prototyping to PLM?

How do I define Impact?
What is effectiveness?

**Impact**: considering occurring problems, limitations, benefits as well as successful solutions for a business in working with 3D CAD software.

**Effectiveness** in working with 3D virtual prototyping technology along the entire product lifecycle. Focus on operations and process improvement instead of financial analysis or cost calculations.
- Briefly mention at beginning of research how I define PLM and what I mean by it
- Virtual prototyping
- Pay attention to consistency of research
- Footwear industry? - my research rather aligns to the companies instead of the entire industry - clarify!

- Clearly define: impact, opportunities and effectiveness
- Align research regarding to one program? mention in RP
- Clarify differences of programs further

- Contact professionals
- Overall conclusion of research: goals form process optimization strategies - overall conclusion!!

- Do research in order to back up the relevance and topic depth
- Is my research question S.M.A.R.T.?

IDEA!

Maybe to show different effectiveness levels within departments?
Standards of innovation are fairly different ...

Only focus on arising Marketing/Sales and Retail opportunities? - NEWEST INNOVATION
EXPO - first ideas
10th February 2016

- timeline
- approach
  - show level of effectiveness (old and new?) - (case PUMA?)
  - show PLM processes
  - show goals achievable and process optimization
Initial 3D modelling steps in Rhino 3D, based on an image working with T-Splines.
### PCP - product creation processes

11th February 2016

**Research and major information for each PCP**

<table>
<thead>
<tr>
<th>1 concept/ design</th>
<th>Important Information/ Questions:</th>
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<tbody>
<tr>
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<td>implementation stage</td>
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<td>3D CAD software, Methods of implementation</td>
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<th>2 development/ modification</th>
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<td>3D CAD software, stage of implementation within companies</td>
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<th>implementation stage</th>
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<td>3D CAD software, arising possibilities to PCP, Methods of implementation</td>
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<th>4 manufacturing</th>
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<td>3D CAD software, time effectiveness, costs?</td>
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<th>5 marketing/ communication</th>
<th>implementation stage</th>
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<td>3D CAD software, Methods of implementation, Consumers acceptance of 3D virtual products.</td>
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<th>6 sales</th>
<th>implementation stage</th>
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<td>3D CAD software, Consumers readiness to purchase 3D virtual products</td>
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</table>
RESEARCH - concept/ design
11th February 2016 - 28th March 2016

5 Design Methods that can be transformed in 3D
- Drawings
- Photographs
- Scans
- Illustrations
- Sketch directly on 3D last

If designers would be able to directly create an avatar of promising designs, colorways, material and features of the shoe could be reviewed and evaluated quicker and a larger variety of design possibilities can be assessed.

Downside is that it requires trained stuff and massive restructuring within design team and linked processes.
Nevertheless it will on the contrarary save time and money during the development stage and enhance the overall product quality. (fewer prototypes and direct, realistic view of sample)
RESEARCH - concept/ design

Foot Scanning Technology in order to create Shoe Last

- 3D CAD
- 5-axis cutting machine
- 3D shoe design software
- Material analysis software
3D lines can be transformed into pattern engineering software
Create shoe simultaneously in 2D/3D
Creation of virtual samples
show color variations right away

For shoe creation, first a last has to be produced/scanned.
From that the 3D virtual prototype can be produced.
Takes up to 10 days.

Especially the tooling is a very tricky part of the shoe and 3D virtual prototyping of the tooling enables a realistic view on the outcome. Samples can be printed if required.
RESEARCH - development/ modification

Tooling Development

Easy adjustments
RESEARCH - presentation
11th February 2016 - 28th March 2016

Easy and quick internal product communication.
Equal and immediate understanding of product, product language and message.
No personal design character that fakes the product's impression it has on the Product Manager by just reviewing sketches.

Most visual product communication amongst all company levels.
Assessible from every computer.

-> Will speed up and clarify internal product communication.

Product range presentation - internally as well as externally.
ADIDAS PREDATOR

MODELING AND TEXTURING
CCS WINTER 2012
SARAH BROMLEY
Easy communication with factories.
Rapid prototyping is easily possible.
Clear image on how to product has to look like.

Downside: material swatches will still be needed in order to communicate the right feel and haptic of the product.
Product Presentation © Mattias Borg
Concept-to-consumer projects
Consumer can vote on design/development which can be executed directly according to the consumers needs.

Realistic product presentation.
Interactive play in-store or online for the consumer when purchasing/shopping the product.

Emphasizes a modern and progressive brand image.
Will draw attention of the consumer.  
Interactive shopping experience. + Digital Showrooms

Emphasizes a modern and progressive brand image. 
Customer can in store play with design features such as color or material. 
Can be part of product decision making.

Key Benefits

Capture the merchant vision and share with stores/retail. 
Use interactive 3D walk-throughs to communicate desired shopping experience. 
Make more well-informed assortment decisions for content and placement. 
Get early feedback on store set up and content of proposed collections. 
Simplify training with an intuitive web-based interface.
RESEARCH - sales

The DNA of all-American style: it's in our jeans.

-Tommy Hilfiger
Digital and virtual showroom/retail solutions
RESEARCH - sales

Digital and virtual showroom/
retail solutions

3D shoe

http://www.3ds.com/industries/consumer-goods-retail/my-store/my-shopping-experience/
**RESEARCH - overall impact of technology**

11th February 2016

**Sustainability Increase**

"3D makes double-digit impacts on the businesses it deals with,"
Asaf Landau

"Fewer samples are used, less product development and design time is wasted, and communications are enhanced, with information shared among buyers, designers and the technical team."
- Singapore-based Ocean Sky International Limited

**Faster time-to-market**

Asaf Landau, CEO at Optitex: "You create fewer samples, increase precision and uniformity of your product line’s fit, and drastically shorten its time-to-market;“

There’s no doubt 3D design and virtual prototyping is a potential disruptor to the traditional way the apparel industry does business, from sampling and pattern making to the creation of 3D digital catalogues and a range of customer-centric services. And with it, comes debate on how the tools are re-writing the rules.
- Leonie Barrie, Just-style.com

**Saving cost**

"Studies have shown that 80% of a product’s manufacturing costs are locked into the approved design, which is why the ability to perform quick and inexpensive design iterations prior to releasing the design has become a critical competitive advantage."
- Saving costs with Virtual Prototyping
SOLIDWORKS Simulation Software Solutions & Services
Creation of a test, companies can do in order to find out about their effectiveness on 3D CAD Software implementation solutions. Inspiration from: ETS.org

-> Establishment of Scorecard system for tracking and monitoring results easily.
CASE STUDY QUESTIONNAIRE

14th February 2016

Key Areas to cover:
Product Creation Processes in Footwear
  Scale & Importance

Virtual Product Creation Processes in Footwear
  Impact
  Limitations & Benefits
  Success Measurement
  End-Consumer Identification
  Future Outlook

Directed to:
Professionals in footwear industry -
  Adidas, Nike, Puma, Underamour etc..
  Product Developers, Product Managers, Product Line Managers
  Suzanne (Hypercraft)

Note:
First Ideas and brain-storming
PROFESSIONAL QUESTIONNAIRE

14th February 2016

Key Areas to cover:

3D virtual prototyping technology (footwear)
   Popular software
   Biggest challenges in footwear PCP
   Impact of 3D technology on PCP
   Existing PCP processes that apply 3D Cad Software
   Possibilities & Limitations
   Implementation Ideas
   Future Prospects

Directed to:
Professionals in developing/ closely working with 3D CAD Software -
   Lectra, Autodesk, Opitex; Browzwear etc..
   Hein van Daanen, Sandra Kuijpers, Lisette (3D Hypercraft), Inneke, Lectra Representatives

Note:
First Ideas and brain-storming
The initial idea was to have two different questionnaires, one for PCP and one for 3D technology. During further research processes I noticed that the professional interview would be sufficient enough.
Feedback on Research Proposal Draft:

Not making use of the word solution as it implies problems - revised option: method

Generally not much feedback, I will continue with my process and plan on conducting the proposal.
Instead of Creating a Timeline the creation of an overview of affected departments and implementation opportunities.

Those not only show possibilities but highlight the developed implementation strategy as well!

Next to that the created test should be accessible for the jury.

Timeline approach (visually) can be kept, instead of timeflow - process flow/overview will be given.
In order to make my research most feasible and applicable I will focus on the following analysis throughout my research. This will help me to make the project more realistic and results measurable!

SMART Performance Analysis KPI’s

-> Implementation Strategy

Note:
Further research on how to conduct each analysis will be required in order to start on it!
EXPERIENCE IN INTERNSHIP (PUMA) - professional talk
19th February 2016

Professional Talk:

Only the development team of Business Units is working with 3D virtual prototyping so far and this is mainly due to tooling developments. As toolings (in; mid and outer sole constructions) take time to engineer and usual CAD is not sufficient enough to review, evaluate or make decisions for alterations, Therefore 3D virtual prototypes are created and results can then be printed to get an even better idea of new toolings.

1. 3D Development tasks/ steps @Puma:
   2. Shoe Last is created
   3. Shoe Last is scanned (3D file)
   4. 3D File is translated into Virtual Prototype (7-10 Days, regarding on difficulty of style)
   5. 3D Virtual Prototype can be 3D printed to see actual tooling (more elaborated than Last)

Sometimes created tooling is used to communicate with the Merchandise department at Puma, but as there are usually no full virtual prototypes developed (tooling + upper) this often isn't effective in order to evaluate entire design decisions.

According to Younji Choi, 3D CAD Engineer at PUMA, 3D virtual Prototyping already at a Design Stage would have huge potential and impact on Style Developments, but the major reason why it is still leaking in implementation and efficiency is the lack of trained stuff. Most designers are not educated enough to work with 3D prototyping technology and/or rendering software yet.

A solution could be that a special „3D technology department“ (New organizational structure) would take care of the development of Style Briefs, in close communication with Product Management and Visual Design, creating most basic, uncolored, simple „style templates“. The core design team then finishes off the 3D Prototype Template by deciding on Colorway’s, Material Placement, Prints, Trimmings etc. - taken from a virtual database, which can be updated and „sourced“ by the visual Design Team itself.

This will be possible, as there are programs such as Morph 3D, featuring a particular Design Suite (i.e. Morph Magic) that helps to put most realistic finishing design touches to 3D virtualizations, inspired by the gaming industry.

Source: Talk with Younji Choi
3D CAD Engineer at PUMA
REFLECTION I
22th February 2016

Is topic relevant enough - Will findings support and form a relevant analysis?
My thought is that the analysis of the entire PCP will be too broad and too general in the end in order to present relevant and in depth information.

After talking to the 3D development manager today, I am wondering whether it might be relevant enough to focus on design and development processes only instead of the entire PCP. As 3D technology is sufficiently developed but company operations are not in line with innovative possibilities yet it might be of interest to focus on implementation strategies for companies.

This would mean to break down my scale of research and focus on Design/ Development processes only. Analysis current situations, identifying problems and limitations and giving implementation solutions in order to improve the effectiveness in working with 3D virtual prototyping on a design level.

Asking the question:
What implementation solutions of 3D virtual prototyping technology to Product Creation Processes on (PCP) is constituted for a footwear company?
After talking to team members at Puma and further personal evaluation, I decide to continue with my initial idea, as I am convinced that demonstrating an ideal standard for each PCP will be of major interest for footwear companies. Even though reality shows that technology cannot be used to full extend and is not yet fully implemented in company structures, this can only be improved and changed when there is a goal defined.

My research will point out the ideal standard in working with 3D CAD throughout the entire PCP of a footwear company. My research will be show a snap shot in time of what is possible at this moment - in 2016. My research will take the ideal and full potential of 3D CAD to businesses as scal and benchmark for research and further analysis.
Great Report on the virtualization techniques and opportunities of 3D modeling in footwear.

Great insight into technology option. Furrure proposals, arising benefits and potential that comes with an implementation of 3D CAD Software.

Also the impact on Commerce and retail possibilities is considered and elaborated.

Highly interesting and supportive for my research!
Particularly interesting article on new technologies complementing the integration of 3D virtual prototyping.

- Color communication software.
- Footwear-like shaped printer in order to directly print on cotton upper.
- Elaboration various 3D virtual Prototyping technology and Suite applications.
  I.e. Optitex O/15
- Examples on Scanning technology that takes measurements for last construction from an avatar instead of scanned objects/feet.

**Texprocess 2015: Software solutions enhance speed and visibility**

22 May 2015 | By: Lennie Barrie

Tools for improved colour communication, 3D design and prototyping, and the integration of key business functions were unveiled at the recent Texprocess trade fair in Frankfurt, Germany. And faster time-to-market, lower quality, lower cost and increased productivity are among the benefits.

Communicating digital colour data:

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PCP QUESTIONNAIRE

2nd March 2016

Key Areas to cover:
Product Creation Processes in Footwear
Scale & Background

Virtual Product Creation Processes in Footwear
Impact Measurement
Limitations & Benefits
Success Measurement
Future Outlook

Directed to:
Professionals in footwear industry -
  Adidas, Nike, Puma, Underamour etc..
  Product Developers, Product Managers, Product Line Managers
  Suzanne (Hypercraft)

Due to an extensive questionnaire and relatively large amount of open questions, the PCP Questionnaire will be used in a selective manner.

Only experts from different departments, that I can approach personally will fill in the questionnaire.

Therefore the conducted primary research can be used to support secondary research, get further insight or receive most realistic personal perspectives on the current situation of 3D virtual technology to PCP.

Basis for quotes, and supportive statements of conducted research only.

FINAL ONE - this is going to be the basis for the questionnaire within the conducted research report.
Improvements on PCP Questionnaire before starting interviews;
- Shorten questionnaire (if possible)
- Reduce amount of open questions (if possible)
- Give topic introduction at the beginning of questionnaire
- Make a list of possible people to contact, make sure to cover all PCP stages and have people from different organizations speak
3D RETAIL EXPERIENCE - research
2nd March 2016

https://www.youtube.com/watch?v=O3EQUoiyeao


http://blog.inventables.com/2013/04/3d-printer-experience-retail-store.html
Digital store-fronts to engage with the consumer (image 1&2).
FEEDBACK: Mainly on chapter 4 (about to start on it)

- Implementation Strategy needs to be feasible!
- SMART Goals need to be measurable
- Performance Analysis needs to be defined and specified further. What do I mean by that!?
- KPI’s need to be very specific and clear.

With the final implementation strategy itself (chapter 4.3) I will wait with further specification and planning as I will have to work with the outcome of before conducted analysis.

50%/100% efficiency of 3D prototyping technology implementation solution? stated the idea and will see if this might be something to consider when starting on chapter 4.3.

Recommendation:
Not only contact H v. Daanen but also Lisette Vonk in order to talk about body-scanning technology.

Jacqui offered to review my Questionnaire as my concern still is that it might be too long and contains too many open questions. This will be very useful before I start to send it out.

EXPO: Ligia and Jacqui emphasized that during the presentation at the Expo I’ll have to present something „new” or come up with a new perspective or point of view on my topic. - I might consider to present my test results for the presentation at AMFI (test subject: PUMA).
COACHING CONTENT

Graduation Project: Table of Content

Abstract
List of Abbreviations
List of tables
Table of Content

1. Introduction
   1.1. Background
   1.2. Opportunity and Problem Statement
   1.3. Relevance
   1.4. Scope of Research
   1.5. Research Question
   1.6. Research Methodology
   1.7. Structure
   1.8. Limitations

2. Product Creation Processes (PCP)
   2.1. PCP in Footwear
       2.1.1. Background
       2.1.2. Company Departments
       2.1.3. Creation Process
       2.2. Key Characteristics
       2.3. Overview

3. Impact of 3D Virtual Prototyping
   3.1. Technology
   3.2. Impact on PCP
   3.3. Identification of Potential

4. Implementation
   4.1. Definition of Goals
   4.2. Performance Analysis
   4.3. Implementation Strategies

5. Conclusion
6. Reference List
7. Appendix
   Fehler! Textmarke nicht definiert.

1) Implementation Strategies
   - Found out that potential/impact on Management & Merchandising PCP is not measurable
   - Will be hard to prove/test
   - Might leave it out for final product
   - Recommendation/feedback on approach

2) Interview w/ A.M. Daanen on (body)scanning Technology
   - How realistic to introduce scanners to retail?
   - What is the potential to personalize the shopping experience through body scanners?
   - How much money costs the investment in a scanner?
   - Personal Opinion: What are future prospects and developments for body scanning – (especially in footwear)
   - Profile:Platform – Footwear last creation without scan, just through digital photo recreation possible last creation
   - Recording of interview

3) Questionnaire
   - Many broad and open questions in my questionnaire
   - What is the main purpose of questionnaire?
   - I intend to use it as additional proof of information in order to back up my findings
   - No numeric research

4) Contact / Coaching
   - Enough contact?
   - More recent updates, process status indication and supporting feedback possible/necessary?

5) EXPO
   First ideas:
   - Timeline approach to show overview and impact of 3D prototyping on PCP in footwear
   - Test (results) – either on “timeline” or separate product visualization
   - Ideally try to apply my test at Puma, as a realistic example.
After the feedback from Jacqui, I have been able to review my questionnaire and shorten it significantly.

Jacqui gave advise on how to shorten and make me reflect on purpose and audience of the questionnaire again. This helped to make it more relevant and accessible for my professional audience.

She also advised, as I also intended, to add a short introduction about the topic and 3D prototyping for users to increase the understanding of my topic as well as related questions.

Questions that have been shortened or erased will be asked during direct interviews w/ professionals that have profound knowledge and where I can guide questions in the right direction in order to receive a most productive and enriching answer.
FINAL QUESTIONNAIRE

Shortened from 23 down to 10 questions in the questionnaire, which cover main and most important information.
At the beginning it was my plan to develop a smart goal on each PCP. After revision I decided to translate the defined potential of the previous chapter into ONE crucial SMART goal.

When starting on the Performance Analysis I realized that it might be the wrong tool to analyse my situation and purpose.

I decided to leave out the performance analysis and to formulate a business objective instead. I also decided to put this at the beginning of the chapter to give an overall objective to the issue. This in turn then is being translated into various SMART goals relating to PCP in footwear (see page 43).
ANALYSIS - performance analysis

Performance Analysis is an objective way of recording performance so that key elements of that performance can be quantified in a valid and consistent manner.

Performance analysis in terms of the research project will be conducted to look at performance action necessary in order to work with virtual prototyping technology within each PCP. This phase will conclude with Key Performance Indicators that are crucial to pinpoint key performance in working with 3D technology in footwear.

After revision I have decided to exchange the Performance Analysis with a Business Objective, stated at the beginning of the final chapter, followed by SMART goals and concluding with Key Performance Indicators! (see page 43).
KPI’s will lay the foundation for the final product - a test that enables companies to assess the effectiveness level in working with 3D virtual prototyping technology to entire PCP performances.

**Definition:** KPI’S are a metric, which is used to determine how you are performing against your business objectives.

<table>
<thead>
<tr>
<th>Key Performance Indicator</th>
<th>Design</th>
<th>PSV (Project Schedule Variance)</th>
<th>Development</th>
<th>21st March 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Capacity Utilization Rate (CUR)</td>
<td>Operating Rate</td>
<td>Used to measure the rate at which potential output levels are being met or used. Displayed as a percentage, capacity utilization levels give insight into the overall situation that is in the department at a given point in time. If it is running at 70% capacity utilization rate, it has room to increase outputs up to 100% utilization without incurring the expensive costs of facilities i.e.</td>
<td>Project Schedule Variance (PSV)</td>
</tr>
<tr>
<td></td>
<td>LOAD Efficiency Measure</td>
<td>Efficiency can be measured differently in every industry, let’s use the manufacturing industry as an example. You can measure your organization’s efficiency by analyzing how many units you have produced every hour, and what percentage of time your plant was up and running.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earned Value (EV) Metric</td>
<td>Earned Value is an approach where you monitor the project plan, actual work, and work completed value to see if a project is on track. Earned Value shows how much of the budget and time should have been spent, considering the amount of work done so far.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Six Sigma level</td>
<td>Six Sigma is a disciplined, data-driven approach and methodology for eliminating defects (driving toward six standard deviations between the mean and the nearest specification limit) in any process—from manufacturing to transactional and from product to service.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td>Delivery to Full, On Time (DFT) Rate</td>
<td>DFT is typically judged against the carrier’s promised delivery schedule, expressed in a percentage.</td>
<td>Process Waste Level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Process Waste Level</td>
<td>Process Waste Level is an indicator of the extent to which a company’s processes are lean and effective.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marketing</strong></td>
<td>Conversion Rate</td>
<td>The conversion rate is the percentage of users who take a desired action. The archetypical example of conversion rate is the percentage of website visitors who buy something on the site.</td>
<td>Customer Engagement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customer Satisfaction Index</td>
<td>Customer satisfaction is defined as “the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (including tangible and intangible factors) exceeds specified satisfaction goals.”</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sales</strong></td>
<td>Sales Channel Density</td>
<td>A measurement of the number of potential customers reached, by distribution channel or intermediary.</td>
<td>Distribution Channels Used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The means by which the company distributes finished goods: via third-party wholesalers, direct to customer, direct to end-user</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overall PCP</strong></td>
<td>Time to Market</td>
<td>In commerce, time to market (TTM) is the length of time it takes from a product being conceived until it is being available for sale.</td>
<td>Process Waste Level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Process Waste Level</td>
<td>Process Waste Level is an indicator of the extent to which a company’s processes are lean and effective.</td>
<td>Waste Reduction Rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waste Reduction Rate</td>
<td>Waste Reduction Rate is a measure of the level to which a company is able to reduce the waste it is generating as part of its operations.</td>
<td>Quality Index</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality Index</td>
<td>The words “Quality” and “Quality Index” are sometimes used interchangeably, but the Quality Index is a more comprehensive measure of a company’s quality performance.</td>
<td>Overall Equipment Effectiveness (OEE)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall Equipment Effectiveness (OEE)</td>
<td>The most widely used measure to determine performance against capability of the equipment is Overall Equipment Effectiveness (OEE).</td>
<td>Supply Chain Milestones</td>
<td></td>
</tr>
</tbody>
</table>
After further research and analysis on analysis technique, I came to the conclusion to change the order of my analysis and to focus on raising business opportunities instead of on a performance analysis. The revised analysis order is as followed:

1. Business Objective (based on defined potential in previous chapter)

2. SMART Goals (on each PCP, developed from business objectives)

3. KPI’s (on each PCP, developed from SMART Goals)

Those three analysis will lay the foundation to state possible implementation strategy for 3D prototyping technology to PCP in footwear and further the basis for the final product; a test on effectiveness of implied technology.

Business objectives are the stated, measurable targets of how to achieve business aims. Business Objectives in this research translates the potential of 3D virtual prototyping into a feasible scenario on how to most effectively make use of 3D virtual prototyping in a footwear company. Based on the defined business objective, SMART goals can be defined for PCP in footwear, supporting steps in order to achieve the aspired Business Objective.
3D prototyping or virtual prototyping specifies three-dimensional visualizations of a product on a computer. Processes in footwear usually start with last (foot-scan) creation in order to enable virtual prototype development. Digital creation processes are communicated as simulation and are traditionally based on 2D design ideas, initiated by product designers. The technology is noted to be a potential disruptor to the traditional way companies create, manufacture and present their products (Leonie Barrie, May 2015).

Within the scope of my graduation project it is my intention to find out about the impact of 3D virtual prototyping to product creation processes within footwear, measure arising potential and to provide feasible implementation strategies.

This questionnaire, as a research tool, shall provide further topic related insight, professional opinion and depict work placement situations, providing a realistic vision.

Body Scanning Technology

1. What is your background and experience in Body-scanning technology?
2. How familiar are you with foot-scanning technology? (Most popular technology?)
3. How feasible is the introduction of body-scanners/ foot-scanners into retail? (Opinion)
4. Do you think body-scanning technology can help to personalize the shopping experience for a consumer? (Opinion)
5. Can you estimate how much money a company would have to invest in order to start implementing own body-scanning technology to their business?
6. What are future prospects and developments for body-scanning technology?
   - Specification for footwear?
7. Have you ever heard from the program ProfileFitPattern – Grafix CAD Software (Footwear last creation without scanning, only through digital photo recreation). What is your opinion on such technology?
8. How relevant will body-scanning technology be for the fashion/footwear industry in the future? (Opinion)
The following interview is based on above listed questions and has been recorded for reference purposes.

Interview Summary:

L.: A lot of companies but also independent projects develop own 3D foot scanners, as they don’t need to be very big and are not as difficult in function (less sensors required).

Also buying footwear online is a big problem, so a lot of start-ups create own body scans for feet. Easier than clothing as there are not many different layers. Indeed a steady product. The shoe will look the same on the foot as in 3D prototype.

Biggest challenge in Body-scanning at the moment is that a scan is always giving a solid shape of the body, however the body itself is not solid. Especially running shoes want to support foot and prevent deforming movement.

There is a company that scans the body, while walking. That way you can analyse what shoe would fit a specific type of feet as they can analyse how the feet reshapes and deforms while walking.

Do companies usually have their own body scanner to create empirical data or do companies rely on data from external parties?

L.: I don’t think a lot of companies are using it.

In footwear at least the major companies take on digital development technology.

L.: Yes, Adidas as well as Nike develop a lot digitally. Nike actually has a whole department internally to analyse how people are walking. I never heard that they are really using 3D body scans, but rather use 3D sensors on the foot to analyse in a walking lab how certain people (healthy, injured, disabled, young and old) walk, run etc.

But Nike works from a consumer perspective and develops the product accordingly.

To clarify, Nike uses the lab and analysis in order to develop new technology and then designs the product regarding the demands of the consumer.

L.: They combine it, design and analysis, but not with scanning. They analyse differences between walking and running, different age groups but also test their product itself. I.e. what happens with different insoles, material etc.

I know that Nike and Adidas are very far in that and they have labs and only walking analysis and then they have different departments that really look at the design of the shoe.

My understanding of 3D prototyping is that it all starts from shoe last creation, which is scanned and then used as template to model the 3D shoe onto it. So there should be scanning involved in 3D prototyping development processes?

L.: Yes, but what they do now, they use some kind of CAD programs that are similar to Lectra Modaris i.e. but more technical that they can create shape in. And they use those kind of shapes as a basis to create the inlay for example.

At Puma i.e. we still create a physical last and scan this afterwards to use as basis for tooling developments.

L.: That’s the traditional way how it works and people are still used to do it that way. It’s a question of skill-level that is introduced to the task. And further you may want to work with a program that is specialized in the development of shoes. And to my knowledge there is no such program yet.

According to my research, there are some small programs specified on footwear, however the major 3D prototyping technology is borrowed from giant software’s, created for other industries, such as Rhino or Autodesk i.e.

L.: Yes, exactly. Rhino is a more design driven software, with its background in multimedia creation. It would be nice to have software that combines design and technical approach likewise. The technology is new, and not well explored. There are a lot of components that make a shoe a shoe. And in the end you don’t want to wear it virtually, you want to wear the product in real life, so of course at some point you need a prototype, to see the prototype in real life. But you kind of need to adjust your whole making process and mind set when working with 3D technology. That’s the thing, people kind of implement it but don’t really change the way of making it. As long as it stay a thing you do next to it, you never use the whole program and its capabilities.

There are multiple parts that come together. You can have the best walking analysis, but how do you implement that into the 3D CAD program i.e.? The fluency, that people understand the entire process, this is coming in here, this is coming in here, that’s the key!

In your opinion, what could be a start or solution on a successful understanding and broad change in working with 3D virtual prototyping?

L.: I think you need, for a start, a program that you can model the shoe in. You need to train people within your company so they can work with it. I think the key in the program is that you can not only model the shoe over a foot, but let the foot move. And see what a certain shoe does to the foot (or vice versa), when walking, running etc. I am a little bit dreaming, because that is very hard, but that would be ideal.

That is another advantage of foot-scans or other data collection on foot shapes as they allow compiling a database. At the least then you can already see if there are specific pressure points or not, or you can already adjust the shoe better to a particular type of person. This will enable you to conclude on a target group as well and to create sizing systems. I have no idea if there are sizing data already available for footwear in that sense.

It can go that for that people scan their foot at home and send in/upload their measurements in order for the company to find the perfect fit. That way the company collects data while satisfying the consumer.
Do you think big, leading footwear companies, such as Adidas or Nike, are able to fully shift from traditional product creation processes to 3D virtual product creation processes?

L.: I think they can, if they want to! That's the thing, it's a big step and it's a risk. People are afraid that they loose money. There is no guarantee of success. But actually, I think you have to agree on that change, because it's the future and we all come to the industry now with the awareness of 3D prototyping and its advantages. At some point the consumer also expects it.

I agree, it is possibly also a question of speed to market increases and demanded enlarged product ranges...

L.: Yes, we all start to work more globally and you are able to communicate your product much easier and quicker through that. And maybe you can even start producing locally again but on the other hand can communicate effectively to China and show realistically how the product should look like.

Can you imagine that body-scanning technology will be introduced into retail models, in order to enhance the customer experience and to collect direct consumer data?

L.: I think definitely. Well, I am not objective as I am involved in many virtual prototyping projects. But I do that because I am convinced that this is the future. I think to let people really experience the product, even though it is not made yet, - how it looks, how it feels etc. - really experience it, is important to be able to produce that customized shoe.

If it will be the only industry, I am not sure. But especially in the spots industry, people spend a lot of money on developments and also the consumed product in the end.

It definitely is a lot about the experience. You have it already in bike stores, that they put you on a bike and according to your race behaviour they suggest the perfect bike for their client. So according to collected data companies can advise a certain product out of their range. With an expert eye on it, I'd say it's a little bit of a retail fake, but it provides the consumer a unique experience.

I think in the future retail environments really have to offer that experience to compete because otherwise people will buy the product online. I think when you rap people in an experience they are more likely to purchase. What I also observe is that people develop scanners today for in store or even for at home rather than for companies itself.

Do you think Co-design is going to be more important and relevant for those retail experiences?

A lot of people are busy with Co-design strategies; is it true that the consumer has a stronger relationship to the product when involved in its design processes; Are they willing to pay a higher price for the product? Does make Co-design a product more sustainable?

I think it is very interesting as you offer the consumer something that they can't get otherwise. That way you remove your product from the mass-market, as it is going to be unique and not comparable to other products on the market.
Many thanks to Lisette for taking the time and giving such broad insights!

Major and most important findings are highlighted in the text.
INSPIRATION - expo presentation idea

30th March 2016

In view of my final presentation at AMFI, I came across a product video of PUMA, featuring a 3D model. The video depicts how realistically, authentic and convincing the product can be promoted when only digitally shown! The video is only 0:52 sec long and could be a perfect kick off for my presentation at the EXPO. https://www.youtube.com/watch?v=O3EQUoivego
How to write a test strategy

The purpose of writing test strategy is to outline the strategic plan how test effort will be conducted for the project. This is usually done at the beginning of Project Development Life Cycle (SDLC) where high level system architecture and processes are being identified. Some examples of documentation required for this document are:

- What is the project scope i.e. what business function to be delivered
- System architecture i.e. 3-tied business logic and/or integration with other new or existing system locally or remotely

The scope of test strategy focuses on the following areas:

- Scope outlining goals, test processes such as defect management, team responsibilities including Business Analyst, Project Manager, Release Manager, Developer and Tester
- Outline a mechanism for handling and responding to feedback from stakeholders on testing progress and outcomes
- Provide guidance to stakeholders involved in testing

When writing a test strategy, the following aspects should be considered:

- Testing objectives
- Testing guidelines
- Testing approach i.e. Requirement Driven Testing
- Roles and responsibilities
- Levels of testing
- Test requirements i.e. test artifacts such as functional specifications, acceptance criteria and test scenarios
- Test deliverable
- Entry and exit criteria
- Defect management i.e. what to do when a defect is reported
- What test reports will be provided
- Test environment information and migration procedures
- Test Constraints
- Test Risk including project and product risks

Definitive Guide to Develop a Good Test Strategy Document with These 7 Simple Steps

What is Test Strategy?
A strategy plan for defining testing approach, what you want to accomplish and how you are going to achieve it.

This document removes all uncertainty or vague requirement statements with a clear plan of approach for achieving the test objectives. Test strategy is one of the most important documents for QA team. Writing it effectively is a skill every tester should achieve in their career.

It initiates your thought process which helps to discover many missing requirements. Thinking and test planning activities help team to define testing scope and test coverage. It helps test managers to get clear state of the project at any point. The chances of missing any test activity are very low when there is a proper test strategy in place.

Test Strategy vs. Test Plan:

Over the years, I see a lot of confusion between these two documents. So let’s start with basic definitions. Generally it doesn’t matter which comes first. Test planning document is a combination of strategy plugged with overall project plan. According to IEEE Standard 829-2008, strategy plan is a sub item of test plan.
Test Strategy

What is it?

What does it look like?

James Bach, Personal Testing Consultant
http://www.satisfice.com

Copyright © 1999, James Bach

Test Strategy

“What we plan to cover the product so as to develop an adequate assessment of quality.”

A good test strategy is:

- Specific
- Practical
- Justified

The purpose of a test strategy is to clarify the major tasks and challenges of the test project.
Test strategy in order to clarify approach of testing system. „Strategy”

Outline - covering questions, approach, starting point, first view on project.

Relatively vague description of test - outline of idea

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Preparation

10. May – Coaching Session

1. Final Product: Validation System (Test Strategy + Test Plan, Test Design)
2. Expo: Test Overview/structure + Test Design + Conducted Test @ Puma
3. Process Book to be continued w/ final product?
5. Any critical comments/notes/feedback so far?
6. Expo Set up and Day schedule - Possibility to have Expo on a Monday?
7. Expo Stand mainly on Final Product or Research or both?
8. Expo Presentation – how long, aim of presentation

Feedback:
Definitely work out Test Design (Part 3) of Validation System before EXPO, as part of the final product!

Recommended Test Design Format would be Digital.
Due to differentiation and not another „paper“ printed document..

Next: Research on Potential Websites that support testing systems.
Three major Test Level that test on pre-defined Test Profiles.

Mainly based on estimation & Experience based.

Too subjective?!
Pass/ Fail Criteria:
Very important to specify in order to validate test system!

Risk Evaluation
Important in order to make test feasible and realistic.
To set into context.

Make one more Graphic that shows the schedule in comparison with occurring risks at certain stages.
FINAL PRODUCT - Test Design
10th May 2016

Potential Websites to use as template:
I.e.

https://www.onlinequizcreator.com
http://www.survio.com/de/

State motivation why to choose format.
Presentation of Research on A3 and printed version. A3 is to highlight major findings and conclusion
- pick up point for final product

Major stand on Final Product
Presentation on Test, showing an example (possibly PUMA) on Laptop
Printed Validation System Document
Print out big sheets with Test overview and Test Levels to trace process.

Presentation picking up from findings of research and explaining motivation for Test. Explaining procedure and benefits.
Importance to industry!
Feasibility elaboration.

3D physical sample in comparison with 3D render, as well as tooling.

Overview on Test procedure, example PUMA, + Booklet overview on conducted Test Example!
International Fashion and Management
AMFI Graduation Project