Augmented Reality based online shopping system

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TY MINI PROJECT REPORT

ON

Augmented Reality based Online Clothing System

BY

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[P1]1

1

CERTIFICATE

This is to certify that the Mini Project entitled " **AUGMENTED REALITY BASED ONLINE CLOTHING PLATFORM** " has been carried out by NAME OF STUDENTS(ROLL NO) in partial fulfillment of Third Year Computer Engineering as well as in the record of Mini-project work done by him/her at SCET,MIT AOE- an Autonomous institute affiliated to Savitribai Phule University, Pune under the guidance of " Guide Name " during the academic year 2019-2020.

Sign:

Name:

Date: Prof. Ranjana Badre

Project Guide /Advisor   **Sign of School Dean (SCET)**

[P2]2

INDEX

[P3]

01. INTRODUCTION

"Augmented Reality based online shopping platform" is a Next-Gen technology which will soon be used in different e-Commerce websites and physical fashion stores.
We are using the idea of Augmentation for giving the people with tool using which they will be able to see the real-time simulation of different clothes with having to wear them physically.
It's a Web-based application which can be accessed from anywhere in the world, all one need is a web browser and internet connection.
It's a platform independent application so it can be run on any sort of OS and machine, e.g. Mobile Devices, Desktop Computers etc

1.1 Problem Definition/Objective

The objective of the project is to provide the world with a great convenience of trying clothes without event wearing them physically.
We are creating an Augmented Reality based we application which can be used to visualize the clothes on your body virtually using web application. This will give user the freedom of trying clothes and will make them able to try as many clothes as possible in lesser amount of time.

1.2 Market Survey

Augmented Reality is a term which is increasingly garnering popularity within the retail and marketing world. Interestingly, fashion's experience based nature makes it a perfect candidate for augmented reality.
In the future, a trend will influence the virtual world more than one can perceive here at this point in time. As per DigiCapital, augmented reality and virtual reality products would generate 120 billion in revenue at the end of 2020. On the other hand, Greg Jones, the director of AR and VR at Google opined that the role of augmented reality is set to be transformative. Moreover, he also added a further note that the case would be same when applied to the fashion retail industry.

It is a widely accepted fact that businesses face a lot of problems when the topic boils down to awareness and engagement of the consumers. Virtual Reality and Augmented Reality helps to solve these issues in a holistic manner.

In the arena of fashion, Augmented Reality or AR is stepping forward to facilitate a vital experiential link to boost in-person shopping and e-commerce. Virtual Reality or VR comprises of an immersive sci-fi quality to it, and this is the reason that it was used in the past by a large number of retailers. Lowe's holoroom, for instance, allows the customers to wear a headset and experience the bathroom and kitchen remodel ideas. However, it is vital to note that this form of revolutionary technology is available in only a handful of stores. Furthermore, at this point in time, it is just being utilized to make a brand statement than actually driving in-store sales.
On the other hand, AR is less flashy than VR, and its implementation is adding a lot of functionality to the manner online shoppers acquaint themselves with the new products and services. AR utilizes a camera so that it can assess a visual trigger in the surroundings of the customer. The user sees a real video of the real world on their handheld gadgets which can be in the form of smartphones or tablets.

In this context, it is interesting to note that this phenomenon usually has a compelling aspect as per the views of millions of Pokémon Go players. Pokémon Go is an ideal example of AR for those who want to meet the character by stepping inside the TV set. The practicality of using AR in fashion and retail can be gauged from the game of Pokémon Go. The players of this game can also view their real-time surroundings on their mobile devices. It is so because the AR app can seamlessly merge the animated world and the real world.

This applies to the fashion industry as well.

Sephora has launched Virtual Artist which is a smartphone application that provides the customers a chance to use various shades of lipsticks by using the front camera. In this context, it is interesting to note that when shoppers see a reflection of themselves which they like, they go forward with the "add to cart" option. Moreover, it is also a fascinating aspect to note that Sephora's Virtual Artist has tried for a whopping 45 million times.

By keeping in mind statistics like these, the luxury brands are also paying close attention. For instance, the brick and mortar Beauty Box Outlets of Burberry are exploring the ways in which more customers can be engaged in cosmetics AR experiences.

AR possesses the ability to lead customers through four stages of marketing. These four stages are in the form of creating awareness, building everlasting loyalty, conversion of purchase decision into buying an increasing consideration. AR would help the retailers holistically move through these phases. On the other side, AR can grant access to the in-store experiences of a fashion store which in turn is beneficial for the growth of a particular fashion brand.

By providing real experiences to the customers, the fashion brand can make sure that the customers are easily persuaded which is, in fact, a great way to boost the sales.

At the Paris Fashion Show, AR was used to organize a fashion show. It allowed the spectators to scan models by using a smartphone application that has the ability to reveal hidden images. Quite interestingly, AR can be used to solve one of the fashion industry's most significant problems: how to show the consumer what the clothing would look like on them. This problem assumes seriousness when you are an online fashion e-commerce brand.

For instance, to attract customers, Zara has planned to integrate AR into its chains. Quite phenomenally, the retailer would bring this technology to more than 130 locations across the world. With the help of AR, Zara would be able to depict models sporting the latest apparels to its customers when they place their smartphones near the sensor located in the store.

On the other hand, Gap has its DressingRoom application that usually allows a customer to select the most suitable body type that resembles them which is very important for activewear. Subsequently, they can see the picture of the apparel of their choice in that body type. This would give the online shoppers a fair idea on how the clothing would look like on them.

5

1.3 Software and Hardware requirement and specification

- **Hardware**

  ○ Desktop / Laptop Device

  ○ WebCam

- **Software/Technology**

  ○ Web-Technology

    ▪ HTML

    ▪ CSS

    ▪ JAVASCRIPT

    ▪ JQUERY

    ▪ PHP

    ▪ BOOTSTRAP

  ○ System Software

    ▪ Apache Server

    ▪ MySql (Relational Database management system)

    ▪ Xampp software

    ▪ Web Browser (Any Latest Browser)

    ▪ ATOM (IDE)

1.4 Target Specification

- Web-based application

- Easy to Install

- Machine Learning Compatible

- Platform Independent

- Uses built-in camera of the device

02. Literature Review

Augmented Reality(AR) is an interactive experience of a real-world environment where the object that resides in the real world is "Augmented" by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory. The overlaid sensory information can be constructive (i.e. additive to the natural environment) or destructive(masking of the natural environment) and is seamlessly interwoven with the physical world such that it is perceived as an immersive aspect of the real environment. In this way, augmented reality alters one's ongoing perception of a real-world environment, whereas virtual reality completely replaces the user's real-world environment with a simulated one.

Augmented reality is related to two largely synonymous terms: mixed reality and computer-mediated reality. The primary value of augmented reality is that it brings components of the digital world into a person's perception of the real world, and does so not as a simple display of data, but through the integration of immersive sensations that are perceived as natural parts of an environment. The first functional AR systems that provided immersive mixed reality experiences for users were invented in the early 1990s. The first commercial augmented reality experience was used largely in the entertainment and gaming businesses, but now other industries are also getting interested about AR's possibilities for example in knowledge sharing, educating, managing the information flood and organizing distant meetings. Augmented reality is also transforming the world of educating, where content may be accessed by scanning or viewing an image with a mobile device or by bringing immersive, markerless AR experiences to the classroom. Another example is an AR helmet for construction workers which display information about the construction sites.

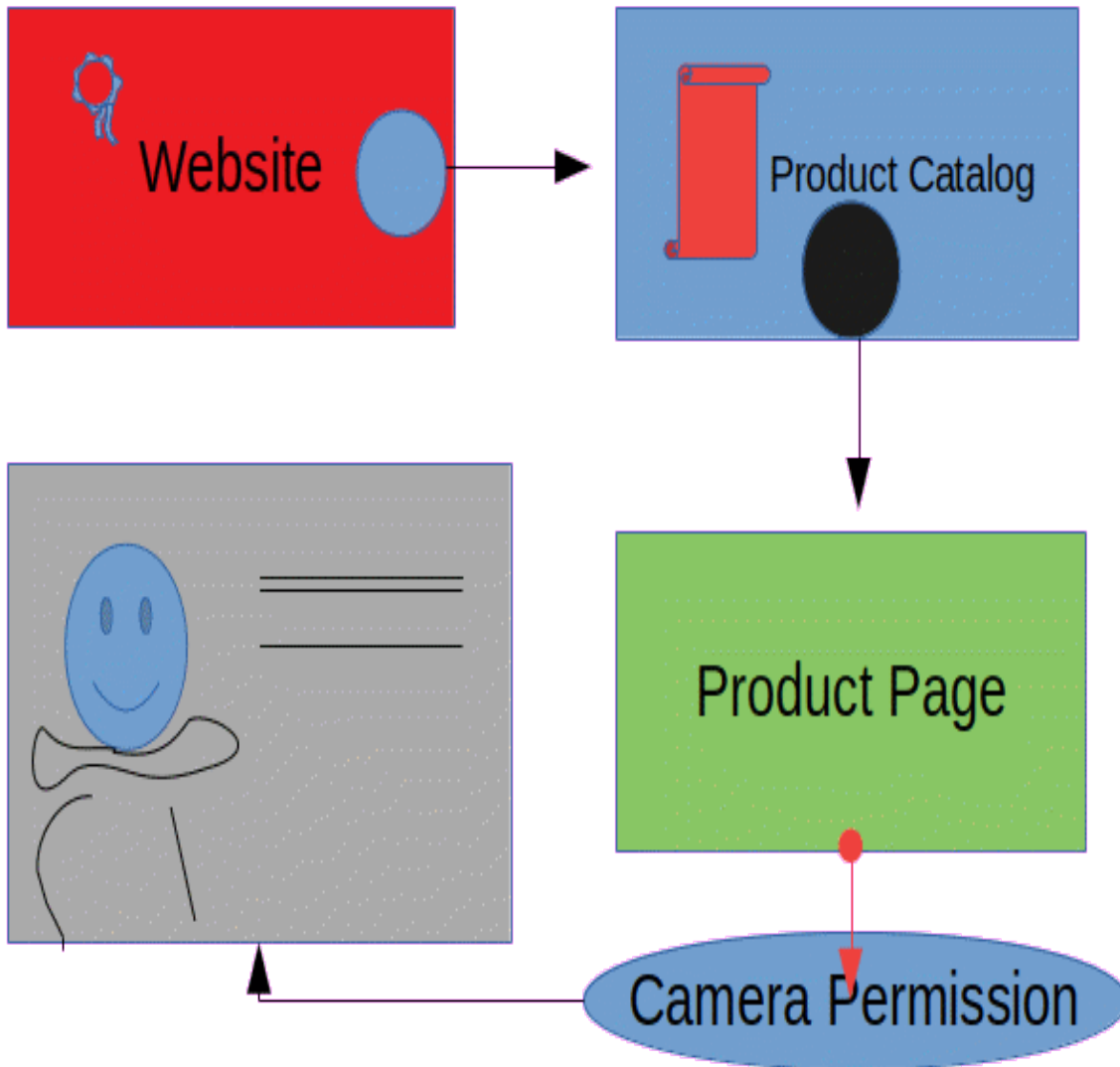## 3. Architecture Specification

3.1 System Architecture

Application architecture is based on web technologies like HTML, CSS, JavaScript and Bootstrap for the Front End.
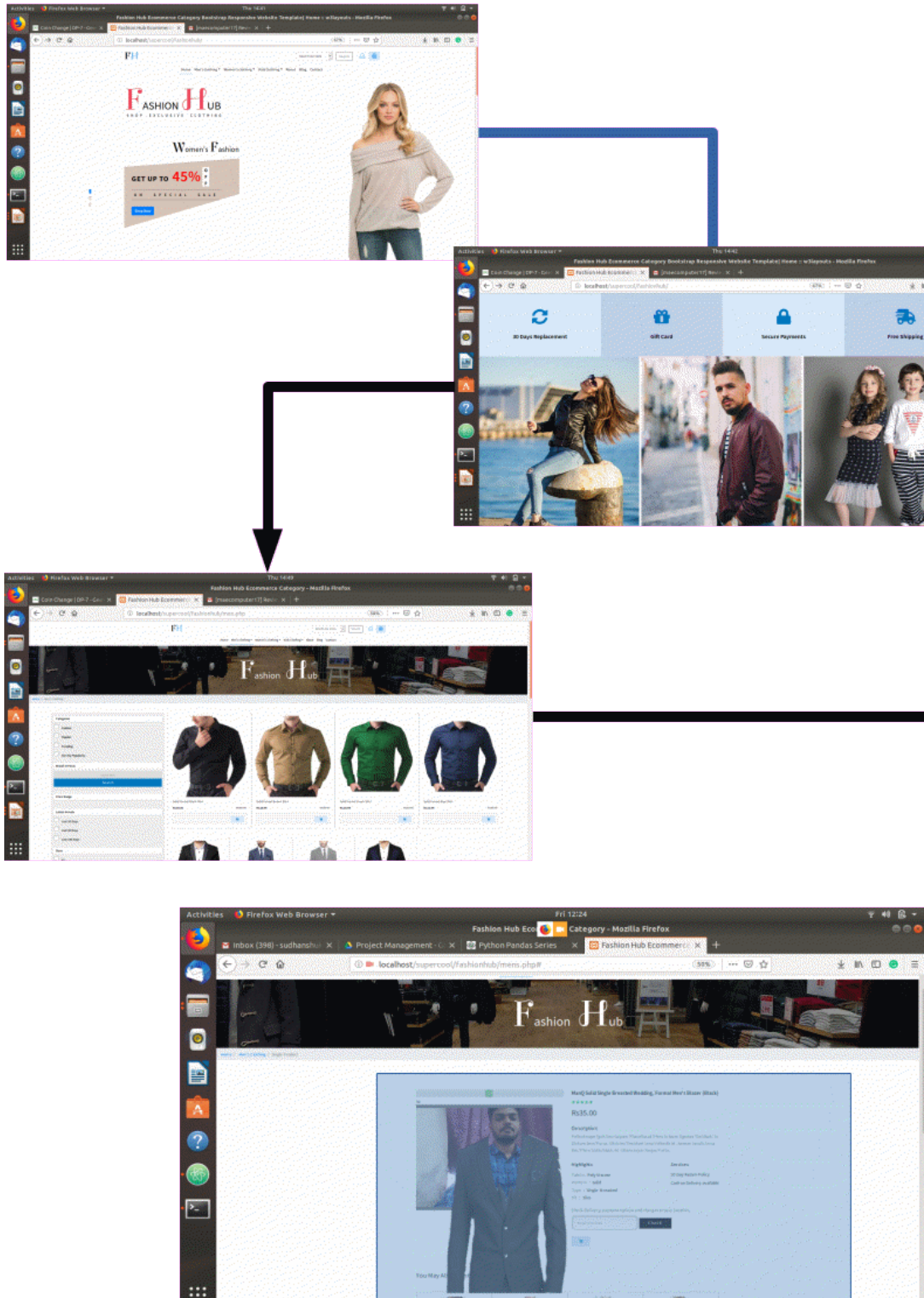
3.2 Data Flow Diagram
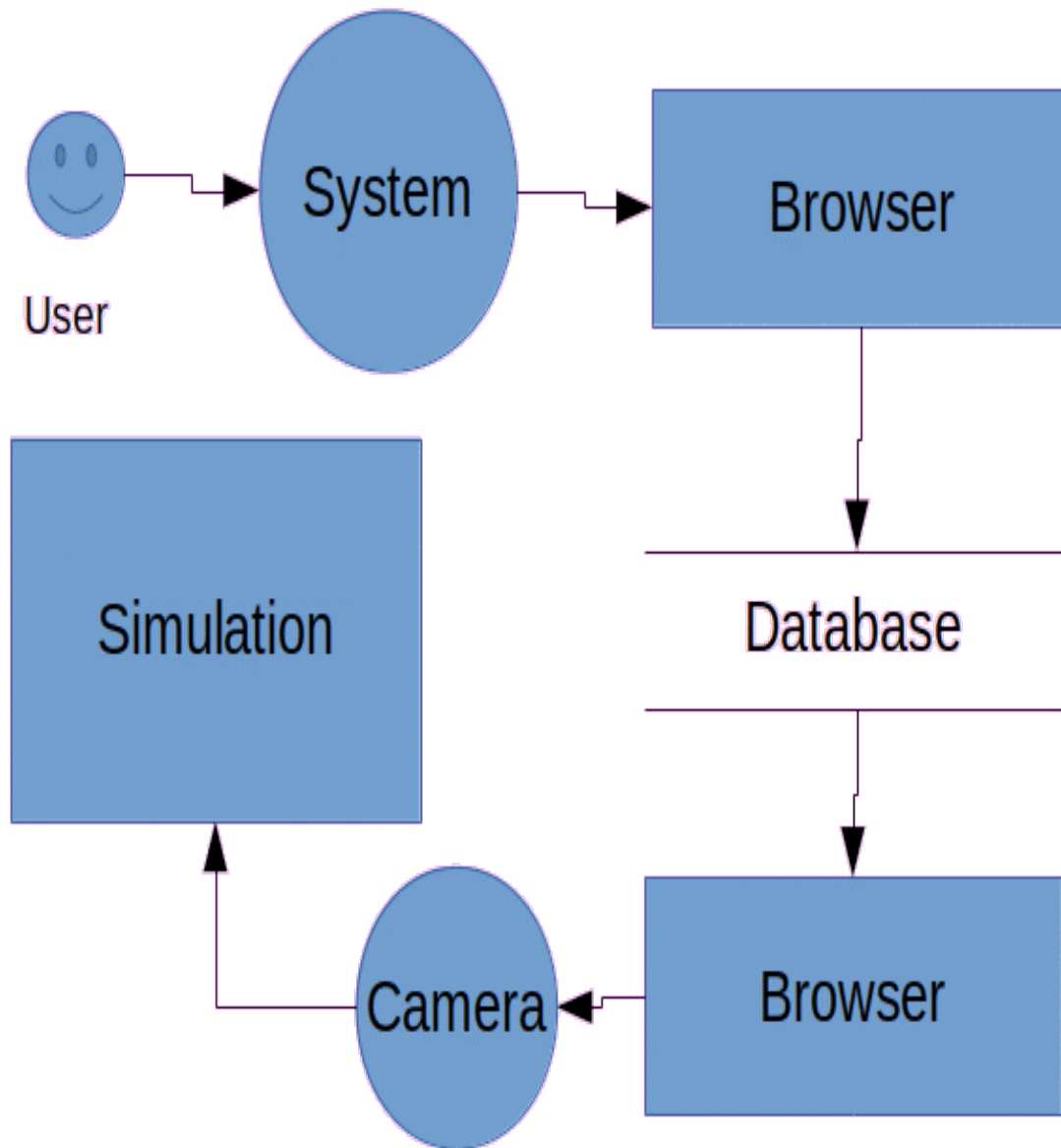
3.3 Entity Relationship Diagram

3.3 UML Diagrams

04. Simulation/Software Development Fabrication of Project

4.1 Process of manufacturing or inventing something

The difference between an idea and a product is manufacturing. A great idea makes no money until it is produced and sold in multiple units. Understanding the options of how your idea can be manufactured can put additional money in your pocket if you make your product yourself and make it both easier to license your idea and get a higher royalty. With a firm understanding of costs and time frame you'll be able to speak intelligently with investors. Last but far from least, as your idea is engineered for manufacturing, you may find new ways to patent and protect it. In summary, knowing the manufacturing process for your invention can help you increase your idea's chances for market success.

While they may vary somewhat depending on industry or company size, the following are the most common reasons process manufacturers choose ERP for process manufacturing:

4.1.1 . Quality Management

Quality management is critical for process manufacturers needing to comply with a plethora of laws and regulations, which can vary depending on where the products are made and sold. An ERP solution helps process manufacturing companies avoid recalls and other legal issues caused by a lack of compliance with safety or industry standards.

Poor product quality can also lead to health hazards like bacterial contamination or environmental issues such as pollution caused by dangerous chemicals. Besides the impact on the revenue of the company and the fines that may be incurred, these issues also impact the brand of the manufacturer. It usually takes years and a *lot* of effort for companies to regain the trust of consumers, which is why manufacturers prefer to prevent these problems from happening in the first place.

4.1.2 Supply Chain Optimization

Supply chain optimization is important for process manufacturers for multiple reasons. First, in order to provide good products at reasonable prices, process manufacturers need to purchase ingredients and raw materials from reliable suppliers. They also need to create long-term relationships with these suppliers. ERP solutions help process manufacturers track performance, costs, transaction history and other capabilities needed for effective and efficient supplier management.

In addition, process manufacturers have specific transportation needs, which can vary from one industry to another. For instance, a food manufacturer may require refrigerated trucks for delivery, while a chemicals manufacturer will need tankers. Not to mention, most countries and states have different rules regarding chemical goods transportation. ERP process manufacturing solutions help organize all of this information so you can fully optimize your supply chain processes.

4.1.3 Recipes and Formulas

Recipes and formulas in process manufacturing are not only complex, but they also don't leave much room for error. A minor change in quantity for one ingredient can lead to the quality management issues mentioned above or may compromise an entire batch. While defective production batches can be adjusted to improve their quality, this process can be very complex, since manufacturers need to take into account all the possible chemical reactions generated by adding ingredients that were not part of the original recipe.

Another important challenge process manufacturers face is that some ingredients can only be used in very specific conditions, related to factors such as temperature, humidity or even exposure to light. Furthermore, the same ingredient may have a completely different impact on production depending on its potency or the concentration of the substance being used. Only a process manufacturing ERP solution can help manufacturers consider all these factors when creating and adjusting recipes and formulas.

4.1.4 Tracked Costs and Profitability

The complexity of the recipes or formulas makes cost tracking a challenge for process manufacturers. Ideally, they should track the cost of every ingredient based on the quantity used and its chemical characteristics, such as potency. Furthermore, the cost of wasted raw materials and ingredients also needs to be tracked as accurately as possible. Without all these details, process manufacturers cannot estimate their total actual costs per unit or compare this with the sales price to determine profit margins.

An important category of costs for process manufacturing is related to the inventory of raw materials and finished products. Not only do they often require special storage conditions like temperature-controlled environments, but these products can have multiple units of measure which makes warehousing even more complicated.

For instance, a finished product like juice can be stored in barrels for one customer, bottles for another and so on. On top of multiple units of measure, manufacturers also need to track expiration dates and lot numbers. Using a process manufacturing software, you can store and aid in the management of all this information.

4.1.5. Adaptation to Different Types of Markets

To adapt to a local market or comply with regulations, process manufacturers may need to implement formulas and recipes specific to the markets they serve. For example, a recent trend forcing food and beverage manufacturers to adjust their recipes is increasing pressure to reduce the amount of sugar in soft drinks.

Packaging and labeling is another challenge that can vary from one market to another. For instance, the information required by law to be included on labels for food or chemicals in Europe is very different than in North America. As for packaging, process manufacturers are trying to create different versions or sizes of their products in order to appeal to various markets. All these changes require an important investment that may disrupt the operations of the manufacturers. An ERP solution can greatly help companies prepare for and implement product packaging changes.

4.1.6. Reduced Waste

Since creating perfect recipes or formulas is almost impossible in process manufacturing, there will always be a percentage of the final output comprised of waste. Waste can also happen when manufacturers change their recipes to adapt to shifts in demand or to address shortages in ingredients or raw materials. While it's very difficult to eliminate waste, process manufacturers can use ERP systems to calculate an estimated level of waste, track the actual waste and compare the two in order to improve efficiency in production operations.

Waste can also occur due to bad planning. For instance, raw materials may expire before being used in production and must be discarded. Moreover, employees can idle for long periods of time due to unplanned changes to the production cycle and equipment downtime. Production planning is, therefore, one of the most important process manufacturing ERP modules that help manufacturers reduce waste.

4.1.7. Agile Production

Process manufacturers rarely focus exclusively on one or a few products. They usually manufacture multiple products, oftentimes producing several variations of each product. Since each product has a different recipe requiring different production operations and equipment, it can be extremely complicated to transition between production cycles. In order to increase productivity and avoid the underutilization of their equipment, manufacturers need to be able to plan ahead and adjust planning when needed.

It is not unusual that a process manufacturer decides to replace a planned production cycle for a product with another cycle for another finished product. Changes to production planning may also happen because the quality is compromised and manufacturers are trying to adjust it. In process manufacturing, these changes are the rule, not the exception. Therefore, companies need a flexible process manufacturing software that allows them to make adjustments quickly without compromising on quality.

4.1.8. Improved Product Development and Go-to-Market Strategies

While product development is mostly managed using product lifecycle management (PLM) software, ERP for process manufacturers contains valuable data that can be used to create new products and improve existing ones. For example, ERP systems provide historical information about sales volumes, returns and customer satisfaction. This can help manufacturers understand which products are successful and which aren't.

ERP also manages the cost required to manufacture finished goods and their variations on time. This information allows manufacturers to deliver better products at lower costs.

Historical data can also help process manufacturers identify trends in customer behavior that may impact their bottom line. In order to adapt to their market, process manufacturers need to adjust their existing offerings, release new products and sometimes decide to discontinue unprofitable products. Due to the competitive nature of their business, process manufacturers may choose to launch products that are not profitable in the short-term but have the potential to become best

sellers in the long-term. This is a risk most process manufacturers have to take in order to remain competitive. But it should be a calculated risk.

4.1.9. Responsiveness to Consumer Pressure to be More Environmentally Conscious

Consumers nowadays have higher expectations than ever, and one of these expectations is for manufacturers to be more environmentally conscious. While manufacturers cannot completely eliminate the negative effects they have on the environment, consumers still expect them to make an effort to reduce emissions and produce relatively clean products.

Even when manufacturers comply with safety laws and quality standards, they also need to take into account other challenges, like the use of conflict minerals (minerals provided by countries ravaged by military conflict and sold to perpetuate the fighting). Since consumers are becoming more knowledgeable and have greater access to information than in the past, they can now boycott manufacturers who use these types of minerals. Using a process manufacturing ERP system, you can find ways to reduce your reliance on these types of resources, building a reputation as a socially conscious manufacturer.

4.1.10. Increased Competitiveness

All of the reasons mentioned above help process manufacturers become more competitive in their market. Nowadays, process manufacturers need to be compliant with quality standards, capable of adapting to changing customer demand, transparent and environmentally conscious, all while keeping costs and waste low in order to be profitable.

4.2 Process of Assembly/Testing

Agile or Waterfall, Scrum or RUP, traditional or exploratory, there is a fundamental process to software testing. Let's take a look at the components that make up the whole.

4.2.1: Test Strategy and Test Plan

Every project needs a Test Strategy and a Test Plan. These artifacts describe the scope for testing for a project:

- The systems that need to be tested, and any specific configurations
- Features and functions that are the focus of the project
- Non-functional requirements
- Test approach—traditional, exploratory, automation, etc.—or a mix
- Key processes to follow – for defects resolution, defects triage
- Tools—for logging defects, for test case scripting, for traceability
- Documentation to refer, and to produce as output
- Test environment requirements and setup
- Risks, dependencies and contingencies
- Test Schedule
- Approval workflows
- Entry/Exit criteria

And so on… Whatever methodology your project follows, you need to have a Test Strategy and Software Testing Plan in place. Make them two separate documents, or merge them into one.

Without a clear test strategy and a detailed test plan, even Agile projects will find it difficult to be productive. Why, you ask? Well, the act of creating a strategy and plan bring out a number of dependencies that you may not think of otherwise.

For example, if you're building a mobile app, a test strategy will help you articulate what Operating Systems (iOS/Android), OS versions (iOS 7 onwards, Android 4.4 onwards etc.), devices (last three generations of each type of iOS device, specific models of Android devices) you need to test the app for.

Usually, a *functioning organization will have nailed their device and OS support strategy, and review it quarterly* to keep up with the market; test managers creating a strategy or plan for their project will help validate the enterprise-wide strategy against project-specific deliverables.

You'd be surprised how many projects have to alter their plan significantly because they hadn't thought enough about support strategy early on. Among other things, the test plan also helps define **entry** and **exit criteria** for testing. This is important as a control for the rest of the team. If the deliverable aren't of a specific level of quality, they won't enter testing; similarly, if the tested code doesn't meet specific quality standards, the code will not move to the next phase or enter production.

Testing performs this all-important **gate keeping** function, and *helps bring visibility* to any issues that may be brushed under the carpet otherwise.

4.2.2 : Test Design

Now that you have a strategy and a plan, the next step is to dive into creating a test suite. A test suite is a collection of test cases that are necessary to validate the system being built, against its original requirements.

Test design as a process is an amalgamation of the Test Manager's experience of similar projects over the years, testers' knowledge of the system/functionality being tested and prevailing practices in testing at any given point. For instance, if you work for a company in the early stages of a new product development, your focus will be on uncovering major bugs with the alpha/beta versions of your software, and less on making the software completely bug-proof.

The product may not yet have hit the critical "star" or "cash cow" stages of its existence—it's still a question mark. And you probably have investors backing you, or another product of your own that is subsidising this new initiative until it can break even. Here, you're trying to make significant strides—more like giant leaps—with your product before you're happy to unwrap it in front of customers. Therefore, you're less worried about superficial aspects like look and feel, and more worried about fundamental functionality that sets your product apart from your competitors.

In such a scenario, you may use lesser negative testing and more exploratory or disruptive testing to weed out complex, critical bugs. And you may want to leave out the more rigorous testing to

15

until you have a viable product in hand. So your test suite at the beginning of the product lifecycle will be tuned towards testing fundamentals until you're close to release.

When you are happy to release a version to your customers, you'll want to employ more scientific testing to make it as bug-free as possible to improve customer experience. On the other hand, if you're testing an established product or system, then you probably already have a stable test suite. You then review the core test suite against individual project requirements to identify any gaps that need additional test cases.

05. Other Specification

5.1 Advantages

- No need to wear clothes every time you want to try it

- Platform independent

- Machine Learning compatible

- Can be installed on physical stores

5.2 Limitations

- Need to have browser

- Needs Internet

5.3 Applications

- Real-time clothing simulation

- Can be installed in physical store

- Can be used for other purposes also

6. Conclusion and Future Work

The concept of e-Commerce itself is an exciting way of shopping but, it can be made even more exciting if we can see how a particular clothe will look on us. Augmented Reality, Virtual Reality is the future of the visualization and that can brought to the Commercial market as well. With the help of our technology the whole way of shopping can be changed.

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