The E-Color Collaboration Design Development Project with a Dyeing & Finishing Factory in Taiwan

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Abstract

The main target of this project is to structure an e-color collaborative platform for professional Dyeing & Finishing factory in Taiwan. In this project we will built a digital color platform to service the customers and link different foreign retailers, brand buyers, apparel factory and chemical auxiliary company together. In the future, foreign retailers will directly discuss with the Dyeing & Finishing factory by the digital color technology to verify the color issues of woven fabric via internet.

In this project, we also build a digital color laboratory that approve with foreign retailer. The retailer will collaborative communicate and check color information through the platform. The scope of the project start from the customer demand stage, prescription and color card development stage, sampling and color checking stage to mass production and verify stage.

This e-color platform not only link up color matching management system, color bank management system, project management system, pattern design linking system, and color easy system . It also utilize the collaborative design IT application tools to raise the performance. The lead time from the development stage to mass production end will shorten from 175 days to 74 days, and the right color match rate at the first time will rise from 75% to 90%. The assignment orders from the foreign retailers will raise 15% at least.

Keywords: e-color, color matching, Dyeing & Finishing factory, data color, collaborative design

1. References and Retrospect

The European corporation of ATC announces the E- TAILOR project. It integrated the 3D digital scanning technology, advanced CAD system and on line virtual fitting dressing technology. It helped the apparel retailer Make- to- Measure the proper cloth for the consumers [1].

MIRALab. The University of Geneva, brings up Virtual fitting room plan. It used the finite element analysis method to establish the mechanical model of the fabric that makes the simulation more real. The Product Display Method call Fashionizer, it is a framework, which fits the needs of garment industry of virtual garment design and prototyping, concentrating on the simulation and visualization features. The framework integrates innovative tools aimed for efficiency and quality in the process of garment design and prototyping, taking advantage of state-of-the-art algorithms from the field of mechanical simulation, animation and rendering [2].

Datacolor's Color Information Management System (CIMS) permits objective and accurate communication of color via e-mail. The system uses SF600 plus CT colorimetry, Colortools quality control, DCIMatch color recipe calculation, and Colorite digital color communication software. The Colorite system uses calibrated monitors to ensure that the sender and recipient judge colors on their respective computer screens under identical conditions. Color data can be input from a spectrophotometer or by using a keyboard to enter reflectance and LAB data. Colors can also be selected from an RAL archive or imported as standard samples from Colortools or DCIMatch. A color slider can also create color data [3].

The article deals with the growing Internet usage in the apparel industry. In a highly visual environment like clothing design and production, the need to communicate color has never been easy. Data Color's Color Information Management System digitizes the designer's specified colors and e-mails the information to suppliers, who receive precise specifications within minutes. Color decisions can be made by viewing digital samples on a monitor instead of waiting for physical samples to arrive. Shirtsdotnet has developed Internet-based software for custom-tailored apparel that enables more than a billion possible combinations with automatic pattern modification. In addition to facilitating communication, the Internet can allow the online customer to purchase a service or result without actually buying the hardware or software that produces it. Online training, support, maintenance and parts order are now quite common via the Internet but Gerber Technology has taken this a stage further by providing a series of online events and specific product demonstrations to help users get maximum benefit from their existing systems or make informed decisions regarding the purchase of upgrades [4].

Featured is an updated version of Macbeth and Data Color International's top line of Color-Eye 7000 spectrophotometer, called Color-Eye 7000A, released in the market in 1997. The version incorporates several additional automated features for greater operating efficiency. Each 7000A comes with a complimentary copy of Macbeth's new Optiview Lite software. One of the new features is a motorized adjustable ultraviolet control that stores up to three settings. A motorized specular insert allows the user to measure color shifts as a result of gloss or texture. A unique touch screen display lets the user view

instrument status at a glance and also allows the user to easily configure the instrument. Color-Eye 7000A has the same true dual-beam design as the 7000. The new model includes a fresh design of removable thin film sample holder for diffuse or direct transmission measurement [5].

This research will construct the collaborative design platform for the Converter operation style corporation. The system integrated the downstream apparel / clothing manufacture, and large brand of foreign company in the same platform. By this issue we study, create the platform and connected the virtual fabric clothing library, and combined the Gerber V- Stitcher system [6].

2. Preface

Now foreign brands and retailers are all considered or even forced the dyeing factory directly by digital color matching technology and software to ensure the quality accuracy and measurement result in discussing color via internet. In the past process, there have not color standards and tools existence to help the factory discuss with customers. The whole spend cycle times and cost of confirm process were too high. Therefore, this project expects to be changing the existing way in color communicated and to highlight the important degree of the dyeing factory in role play.

The digital color service and tool established is key point; it is help Taiwan's company to get the order for goods from the foreign brand. This project is to build the first representative example; it is directly connecting the War-Mart and adidas with the communication platform. This advanced information platform link up the foreign brand, dyeing factory and strategic suppliers together and directly to carry the color communication out in the same platform.

Through the virtual design chain established, utilize information science and technology to connect and share each other in manufacturer's information, in order to offer the support and service for the customer and to cooperate with the research, development and decision behavior. These efforts meet the variety demand of the customer, and work together to reduce the cost and cut down the production cycle of the supply chain.

3. Project scenarios introduction

3.1Business Model analysis

The business model shown as the figure 1, the goal of this project is to raise the proportion of the assignment from the foreign brands. The 2nd purpose of this project is to expand the achievements to other dyeing factories and push forward the group power in textile industry.

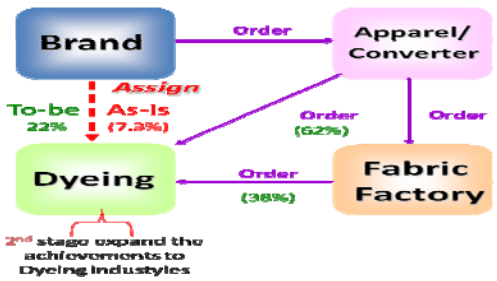

Fig. 1.The Business Model Analysis

3.2 Design Model analysis

The design business model shown as the figure 2, the shortcomings of the present model are too much confirmed points confuse with the color information. The information of color misunderstood influencing the delivery and quality, especially in high functional and performance fabric and apparel.

The future design business model, directly connect the brand or retail with dyeing factory in the same platform, and communicate with each other by digital color data to avoid mistake and immediately verify the data in time via internet.

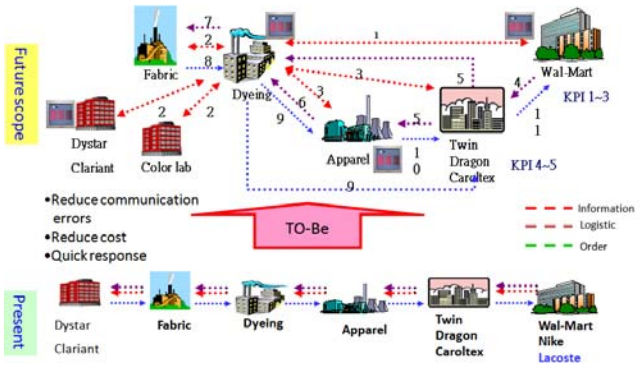

Fig. 2.The Design Business Model Analysis

3.3 The color management and processing improvement

The color management and processing improvement illustration shown as the figure 3, the total cycle time of the As-Is model is 175 days, and the To-Be model is 74 days. Through the digital collaborative design operation processing, the dyeing factory and other manufacturers can easy get the order and improve the operation, and color design in with the foreign customers.

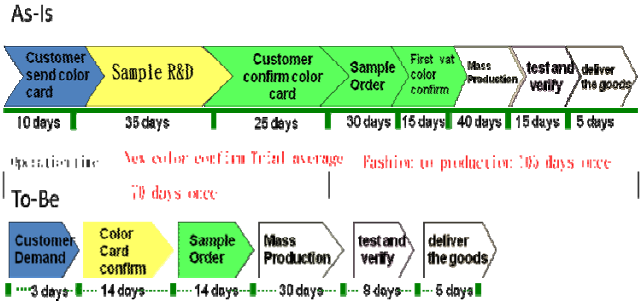

Fig. 3.The color management and processing Analysis

3.4 The IT framework

The *IT* framework shown as the figure 4, the framework integrated 5 main systems and included with the enterprise portal and security management planning also. The e-color platform integrated the Color Easy Color management system, Color data sharing platform system, Project collaboration management system with workflow, R&D Linking system, and Color test and verify system. The backbone as the fig .4 shown, it is link up the data bank center, Color Lab information system, R&D data sharing system, Fabrics data system, Dyeing Processing data system, and Finishing Processing data system. All the basically information come from the existing Enterprise Resource Planning system.

The whole system also integrated the datacolor spectrum instrument, logic art dipping machine, color service machine, and

collaborate the color design data with existing color tracking software and tools.

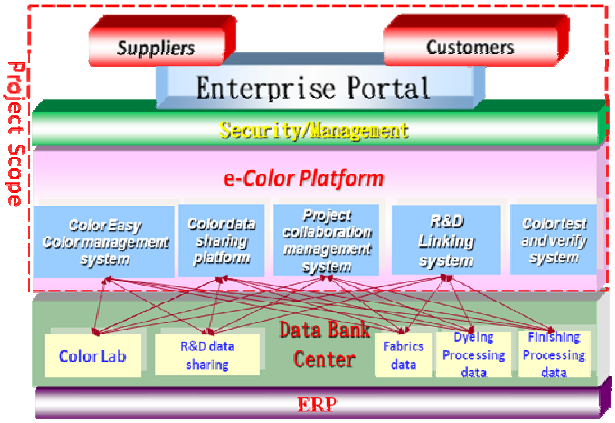

Fig. 4.The IT framework of project

3.5 The Color Easy integrated framework

The color easy framework shown as figure 5, this platform integrated 3 main work flow, from Sale section, R&D section, and production section. The customer works with the section of R&D and production employee together directly. In the future, the digital color track not only depends on the data but also the color image.

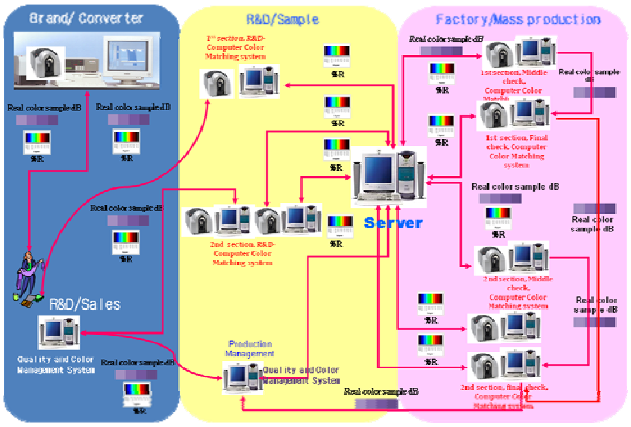

Fig. 5.The *Color Easy integrated framework*

3.6 The Color Easy integrated framework

The method of connected via a computer and it is classification of the customers and suppliers, shown as Table 1. The total number of the connection object is 39, and the classification in this project is to sort as 2 classes.

Table 1. The method of connection and classification

Classification	Collaboration method	Object number		
		Customers	Suppliers	Total
I	Interactive within design processing	5	3	8
II	Exchange the data of the design	8	23	31
Total		13	26	39

3.7 The System platform framework

The system platform framework shown as figure 6, the application develop tools are Visual Basic, Java, and VB.net. The data base server is SQL. The architecture is the Client/Server. The operation system has to upgrade up to Microsoft XP professional version.

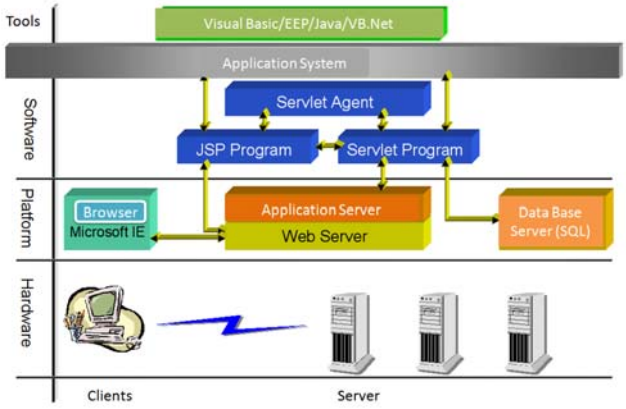

Fig. 6.System Platform framework

3.8 The Software Architecture

The Software Architecture and Programming Architecture are shown as figure 7 and figure 8.

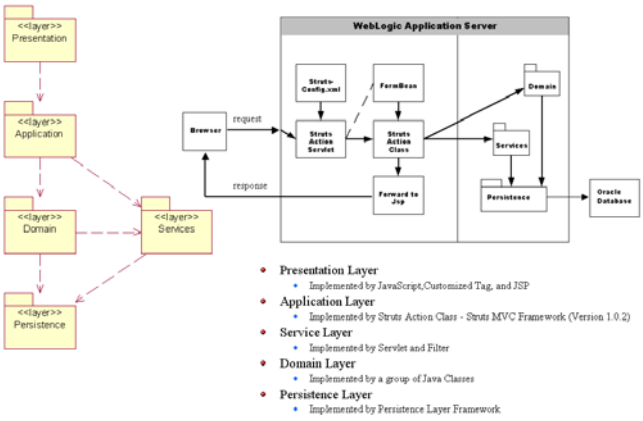

Fig. 7.Core- Software Architecture

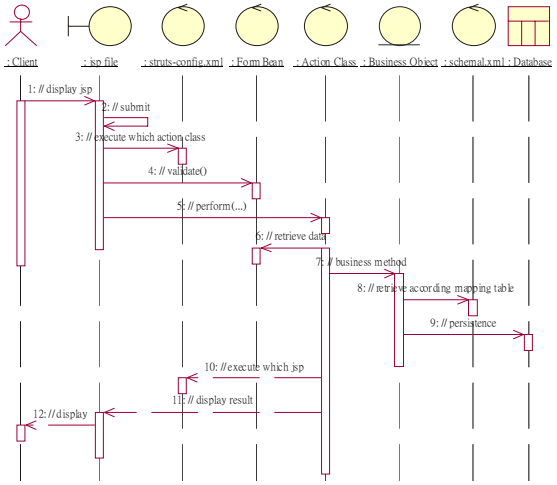

Fig. 8.Core-Programming Architecture

4. Project beneficial result

4.1 KPI (Key Performance Index) interpretation

The KPI interpretation is shown as Table 2.

Table 2. IT implementation benefit and KPI

KPI		Now(95)	After(96)	After(97)
Strategy Phase	The total test verify number of times used Color Lab Service in Textile	0	30	50
	Pass the color lab accreditation for foreign customer	0	2	3
	Number of times of the digital color service with foreign customers	0	10	20
	Extend to the Dyeing line of work	0	2	6
	The total number of times in color Data Bank	5,000	10,000	15,000
	Raise the assign proportion of the order from foreign brand/retailer	7.3%	22%	30%
Operation Phase	The total number of days of production operation	175 days	74 days	60 days
	The proportion of the first time success at once	75%	90%	93%

5. Conclusion

1. This e-color collaboration design platform is applicable to dyeing factory which has the ability of receiving orders from international famous brand and ability of directly color matching with them, and which is the company of functional fabric dyeing and finishing.
2. Building the functional fabric color matching and service center, establishing the e-color collaboration designs information system, reaching the fast color matching and service, prompt sample making, and prompt order receiving. Using perfect linking together the color bank knowledge base management system, Color Easy Color management system, Color data sharing platform system, Project collaboration management system with workflow, R&D Linking system, and Color test and verify system. We expect to deepen customers, companies, and suppliers interaction of color matching and researching service.
3. Competing trend has turned from product competition to processing competition and service. There will be the competition of supply chain system transnational in the future. Taiwanese producer which regard OEM as the oriented survey style will face the major challenge.
4. The only way to create the whole value in the future would be those who use cooperation to replace independence competition, and those who use supply chain and with whole members working together.

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