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QFD-based Curriculum Planning for Vocational Education

Catherine Y. P. Chan

Institute of Textiles & Clothing, Hong Kong Polytechnic University, Hong Kong
Email: cylumcat@hknet.com

Dr. K. Chan

Institute of Textiles & Clothing, Hong Kong Polytechnic University, Hong Kong
Email: tcchank@inet.polyu.edu.hk

Dr. W. C. Ip

Department of Applied Mathematics, Hong Kong Polytechnic University, Hong Kong
Email: mathipwc@inet.polyu.edu.hk

ABSTRACT

The purpose of the paper is to conceptualize the incorporation of QFD into curriculum planning of vocational education for the manufacturing industry in Hong Kong. In order to facilitate the course planners to develop new curricula, not only the basic principles and mechanism of incorporating QFD into curriculum planning of vocational education is explained, but a pilot study on identifying the important kinds of industry-specific knowledge for merchandisers of the clothing industry with using Blitz QFD® is also shared. We sincerely hope the conceptual model will assist the course planners to understand the basic principles of customer-oriented curriculum planning and the pilot study will help them to acquire the basic techniques of QFD to develop new curricula.

Keywords: QFD, curriculum planning, vocational education, merchandising

1. Introduction

Since the early 1990s, the manufacturing industry of Hong Kong has successfully evolved from a famous production center that relied heavily on assembling products for the Western countries to an international trade center that emphasizes on providing professional merchandising services to the global market. The major workforce to be required by companies of the manufacturing industry is no longer skilled labors but knowledgeable practitioners. The government-subsidized vocational education (VE) institutions, which were established during the “Golden Age” of the manufacturing industry with the main purpose of training production workers, are now struggling to adapt to the change. Since the structural change of the manufacturing industry that started in the late 1980s, the major source of income of the VE institutions has been adversely affected. The number of trainees has tremendously reduced and the local exports are on the decline. However, it is unlikely that they will receive new financial support from the government and the industry in the form of direct subsidies. Marketization, to certain extent, lies ahead for them. Although the shortage of cash

is a thorny problem that the VE institutions need to solve immediately, they have to understand that the real problem behind the financial stringency is their inadequacies in meeting the new set of market needs.

Quality function deployment (QFD) has been proved successful to develop new products and services for winning customer satisfaction in many industries all over the world. It has been widely applied in planning and problem solving processes. For the education sector, QFD has been demonstrated to design educational services, e.g. Grimes et al. (1994) and Hwang & Teo (2001), and to improve teaching methods, e.g. Lam & Zhao (1997). QFD is also used to plan course contents, e.g. Burgar (1994), Ermer (1995), Hillmer et al. (1995), Owlia & Aspinwall (1998), and Bier & Cornesky (2001). These cases are contributive in sharing their experience with us on applying QFD in different situations. This paper, however, is to conceptualize the incorporation of QFD into curriculum planning of vocational education for the manufacturing industry in Hong Kong. In order to facilitate the course planners to develop new curricula, not only the basic principles and mechanism of incorporating QFD into curriculum planning of vocational education is explained, but a pilot study on identifying the important kinds of industry-specific knowledge for merchandisers of the clothing industry with using Blitz QFD® is also shared. We sincerely hope the conceptual model will assist the course planners to understand the basic principles of customer-oriented curriculum planning and the pilot study will help them to acquire the basic techniques of QFD to develop new curricula.

2. Customer-oriented Curriculum Planning

The exposure to the open market challenges the VE institutions to transform from the “Era of Quantity” to the “Era to Quality”. This involves a paradigm shift from producer orientation to customer orientation, from an inside-out perspective to outside-in perspective. The VE institutions were originally responsible for providing centralized and coordinated training to the manufacturing industry to fulfill the huge need of skilled labors. Their set-ups were productive systems. All the VE institutions have to do was to provide the infrastructures, facilities, machineries and trainers for turning raw labors into skilled labors. In the face of the financial problem, the VE institutions have been trying to make use of their physical and human assets to offer a greater diversity of choices to attract students. However, such “product-out” approach to offer courses could only help them to attain short-term financial goal. In the long run, they have to adopt the “market-in” approach to develop new courses to attain the business goal of customer satisfaction.

The manufacturing industry has developed to a new stage. New business requires new workforce, and new workforce requires new vocational competency. The paradigm of customer orientation is absolutely essential for the VE institutions to develop new courses to teach new vocational competency for the new workforce.

3. Primary Customers of Vocational Education

The central message of marketization for the VE institutions is that instead of the industry, individuals will be their primary customers (Hittman, 1993). It is not simply a change of customers to whom the VE institutions are going to serve, but, much more than this, it is talking about a change of the purpose and the way the VE institutions contribute to the socio-economic development. In the new economy, business enterprises require knowledgeable workforce rather than skilled labor to support them to compete in the global market. The new purpose of the VE institutions is to prepare individuals for their initial employment and subsequent promotion in various branches of the economic activities of the society. The value of the VE institutions is their professionalism in developing vocational competency for individuals so as to enhance their contributions to companies.

Akao, Nagai and Maki (1996) explained the concept of quality evaluators to university education, which is equally true for vocational education. Students (graduates) are an internal evaluator of the educational process as they are the recipients of the educational services whilst employers are an important external evaluator of the educational “product” because they are the “user” of the graduates. Employers are the primary source of voices for planning curriculum but students should be listened for designing the instructions, as they are the recipients of the educational services.

4. Quality Function Deployment

QFD is a concept, a system and a tool. First, QFD displays the notion of customer orientation for designing products and services. Its advocacy is to listen to the customers and translate their requirements all the way back in any business process so that the end product or services turned out will satisfy their needs and demands. Second, QFD is a quality assurance system of which customer needs drive the product design and production processes. Third, QFD is an operational tool. The quality tables, or the set of matrices, provide a simple instrument for translating the customer requirements into the appropriate technical requirements for each stage of product

development and production.

QFD provides an organized, systematic approach to bringing customer requirements into product and services design using customer inputs and cross-functional involvement (Hauser & Clausing, 1988). It provides the way to more objectively address subjective needs yet demonstrates the belief in customer focus and employee involvement to bringing an all-win virtuous cycle for every party involved in the supply chain.

5. Incorporation of QFD to Curriculum Planning of Vocational Education

Competency is all about being qualified to do a position’s work. It is talking about a combination of knowledge, skills and attitude that allows a person to perform a role or function at a specifically defined level of proficiency (Lucia & Lepsinger, 1999; Spencer, Jr. & Spencer, 1993). An organization must have the people to possess the competencies that it needs in order to achieve its business goals and objectives. Course planners have to understand the vocational competencies, that is, the industry-specific knowledge and skills to be required by the major manpower, before they could be able to effectively plan the curriculum and design the instructions. Exhibit-1 illustrates the conceptual model of applying QFD to curriculum planning for vocational education. It is used to explore the job needs so as to identify the vocational knowledge and skills that to be required by the jobholders for planning the course contents.

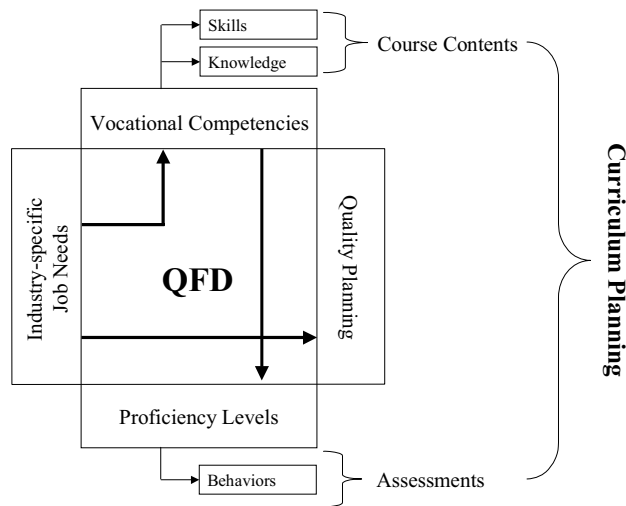


Exhibit-1: The conceptualization of applying QFD to curriculum planning for vocational education

6. New Needs for Vocational Education

After the massive transplantation of labor-intensive assembly lines to the Mainland and some other developing countries in the late 1980s, the primary business activity of the manufacturing industry has changed from production of orders to follow-up of production orders. Sales offices mushroom and merchandising develops rapidly. Merchandisers become the major workforce of the trading companies to provide sales services to buyers. In industrial terms, the manufacturing industry has developed from OEM (original equipment manufacture) to ODM (original design manufacture). The VE institutions have to realize that the required competencies of trade services personnel are very different from those of production personnel. Instead of operation skills and production knowledge, competent trade services personnel are expected to possess professional and updated product and market knowledge in addition to production knowledge. Unlike for training production personnel, vocational education is not the sole but only a vital aspect for developing “total” trade services personnel. In the coming future, it maybe necessary for the VE institutions to collaborate with schools and universities, enterprises and some other training organizations to provide total curricula for the trade services personnel.

With China’s accession to the World Trade Organization (WTO), more and more buyers from all over the world will purchase merchandise with this “world factory”. Being a special administrative region of China and a metropolitan city, many foreign importers and global brands are attracted to set up their buying offices in Hong Kong to purchase merchandise of which mostly to be produced in the Mainland and some in other developing countries. Stepped into the new millennium, the manufacturing industry is at the critical turn of changing from the provision of sales-based to purchasing-based merchandising services. The manufacturing industry is taking a step further to develop from an international trading center to a global sourcing center. The turn is of paramount importance to the development of the manufacturing industry as it serves as the prelude to transform to OBM (original brand manufacture). The turn from providing sales-based to purchasing-based merchandising services of the manufacturing industry will add a further challenge to the VE institutions. Although both kinds of merchandisers are administrative in nature and execute similar operations, their responsibilities are not the same. The former works for the producers but the latter represents the buyers. Due to their bilateral relationship, their perspectives and concerns are different, although they both have to work together to deliver optimum values to the ultimate end-users.

7. Pilot Study on Processing Customer Voices for Curriculum Planning

A pilot study on understanding the job requirements for merchandisers of the current clothing industry was conducted early this year. Four merchandising managers of buying offices were individually interviewed with the purpose of understanding their expectations with the job activities that to be performed by merchandisers. Blitz QFD ® was used to process and deploy the customer voices (Mazur, 2003). The verbatim of the interviews was recorded and jotted down with wordings that are as original as possible onto the customer interview table. Each piece of verbatim was then simplified and carefully extracted into single-issue expressions. However, the extracted expressions are not purely customer needs but mixed with suggested technology, functions and solutions, etc. In order to separate the customer needs from the mixture, the expressions thus entered into the appropriate columns of the customer voice table (CVT) and translated into customer needs with indicated arrows. Exhibit-2 is the customer voice table that displayed the identified customer needs, which in our case are the job activities of clothing merchandisers that expected by the managers.

Affinity Diagram was used to structuralize the job activities of clothing merchandisers into meaningful groups. The bottom-up clustering technique of Affinity Diagram is one of the Japanese seven new QC tools, which has its origin in the KJ Method ® that developed by Jori Kawakita. It is particularly useful for locating and structuring the problem when the situation is fuzzy, indeterminate and ill defined (Mizuno, 1988; King, 1989). One of the authors and two of the interviewed managers did the grouping. Exhibit-3 illustrated the Affinity Diagram of the resultant groupings of the job activities. Considering the total is the job of clothing merchandisers, the first level is their responsibilities, the second level is whom they work with and the third level is their activities.

By rotating the Affinity Diagram from a top-bottom to left-right orientation, the levels of customer needs are displayed in the form of Hierarchy Diagram. After discussed on whether there was any missing need with the job of clothing merchandisers, the author and the two managers prioritized the customer needs with the purpose of identifying those important ones. AHP is recommended for this prioritization process. However, in this pilot study, we used normalization as an approximation to prioritize the needs. Exhibit-4 is the Customer Needs Hierarchy of the pilot study. Upon prioritization, five out of eleven job activities were found to be important and to

be further deployed. Finally, the important job activities that identified were further studied by using the Maximum Value Table (MVT) (Exhibit-5). The key job activities were driven forward to explore various dimensions of curriculum planning. For merchandisers, market knowledge, product knowledge and production knowledge are essential for them. In the pilot study, we found the important task that the VE institutions have to further investigate is on how to educate the clothing merchandisers with product knowledge, a piece of vital knowledge for their work. Gemba visits to the actual workplaces to understand the problems with merchandisers are definitely essential while interviews with merchandising managers will also gain more insights on understanding the further needs of merchandisers.

8. Conclusion

In the new knowledge-based economy of Hong Kong, the major kind of workforce to be required by the enterprises is trade services personnel. The vocational education practitioners have to fully understand the change so that they could be able to provide the right kinds of courses and educational services for meeting the new market needs. The problem with them is using subject-matter expert approach, which has been popularly used for designing vocational education courses somehow because vocational education was originated from apprenticeship. The course planners and instructors use their experience and personal judgment to determine what supposed to be learnt by the students for yielding desirable work performance. The point is such way to design courses may not fully satisfy the genuine needs of the students because it is not started from the customers' perspectives. QFD assists the vocational planners, lecturers and instructors to move away from subject-matter expert approach to practicing customer-oriented curriculum planning. Dr. Akao (1990) emphasizes the conversion of demanded quality into quality elements as this process depicts the criticality of customer orientation – from the world of consumer to the world of engineer.

Although the pilot study is not a comprehensive research, it has provided a practical exercise and a direction for a further formal study on understanding the new needs for vocational education by the contemporary clothing merchandisers. In the face of marketization, the VE institutions will turn a new page. Marketing will become a strategic function and is responsible for exploring the new set of customer needs and finding ways to those needs fulfilled. Instead of only thinking about how to attract more students and promote the graduates to employers, course development is new but very important job that the course planners have to take up immediately. QFD

will assist them to explore the new competencies to be required by the new job categories of trade services personnel.

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Authors' Backgrounds

Catherine Y. P. Chan is a PhD candidate of Institute of Textiles and Clothing at the Hong Kong Polytechnic University. She was a course administrator at the Clothing Industry Training Authority for 8 years before she enrolled in her PhD study. Her research is to propose a QFD-based instructional design model for vocational education.

Dr. K. Chan graduated from North Carolina State University. He holds a MSc award from University of Manchester and PhD from the University of Salford. He has worked in textile companies in both Hong Kong and Taiwan before he teaches at Hong Kong Polytechnic.

Dr. W. C. Ip holds a PhD from Leeds University. His research interests include social scaling, financial time series and environmentrics. He has also been actively engaged in consultancy work on social and economic issues.

Product Features				Design (technology selected)	
Solutions (technology independent)		Technology		Components	
Characteristics & Capabilities		Functions (hardware)			
Situations	Problems	Opportunities	Job Activities	Characteristics & Capabilities	Functions (hardware)
Many samples turned out are not what the designer wants	Poor message transmission from idea to sample		He/she has to explain the design requirements to vendors for making samples	He/she should represent the designer to work with the vendors to develop products	They should know how to interpret designer's ideas for product development
Many samples turned out are technically infeasible	Problems happened after the production has started		He/she has to provide clear information to vendors for making samples	He/she should represent the designer to work with the vendors to develop products	They should know how to follow up with buyers for their purchase orders
Orders could not be properly delivered to buyers			He/she has to clarify the design requirements with the designer for making samples	His/her work is to deliver goods to the buyer according to the purchase orders	They should know how to solve problems for vendors
Merchandisers do not have the knowledge to judge if the vendor is telling the truth	Give unnecessary problems to buyers		He/she has to suggest to the designer to adjust designs for making samples		They should know how to solve problems for customers
Merchandisers do not have the knowledge on how trade operates			information from buyers about their order requirements		
Merchandisers do not know how to coordinate with the shipping department for shipment of goods			He/she has to give clear instructions to the vendor for production		
Merchandisers only concentrate on orders not finance			potential problems with producing buyers' purchasing orders		
			He/she has to give advice to buyers to avoid unnecessary production problems with their purchasing orders		
			He/she has to suggest to vendors to solve production problems		
			He/she has to suggest to buyers to solve selling problems		
			He/she has to identify the causes when problems happened		

Exhibit 2: Customer Voice Table of the pilot study for identifying the job needs of clothing merchandisers

Customer Needs Affinity Diagram

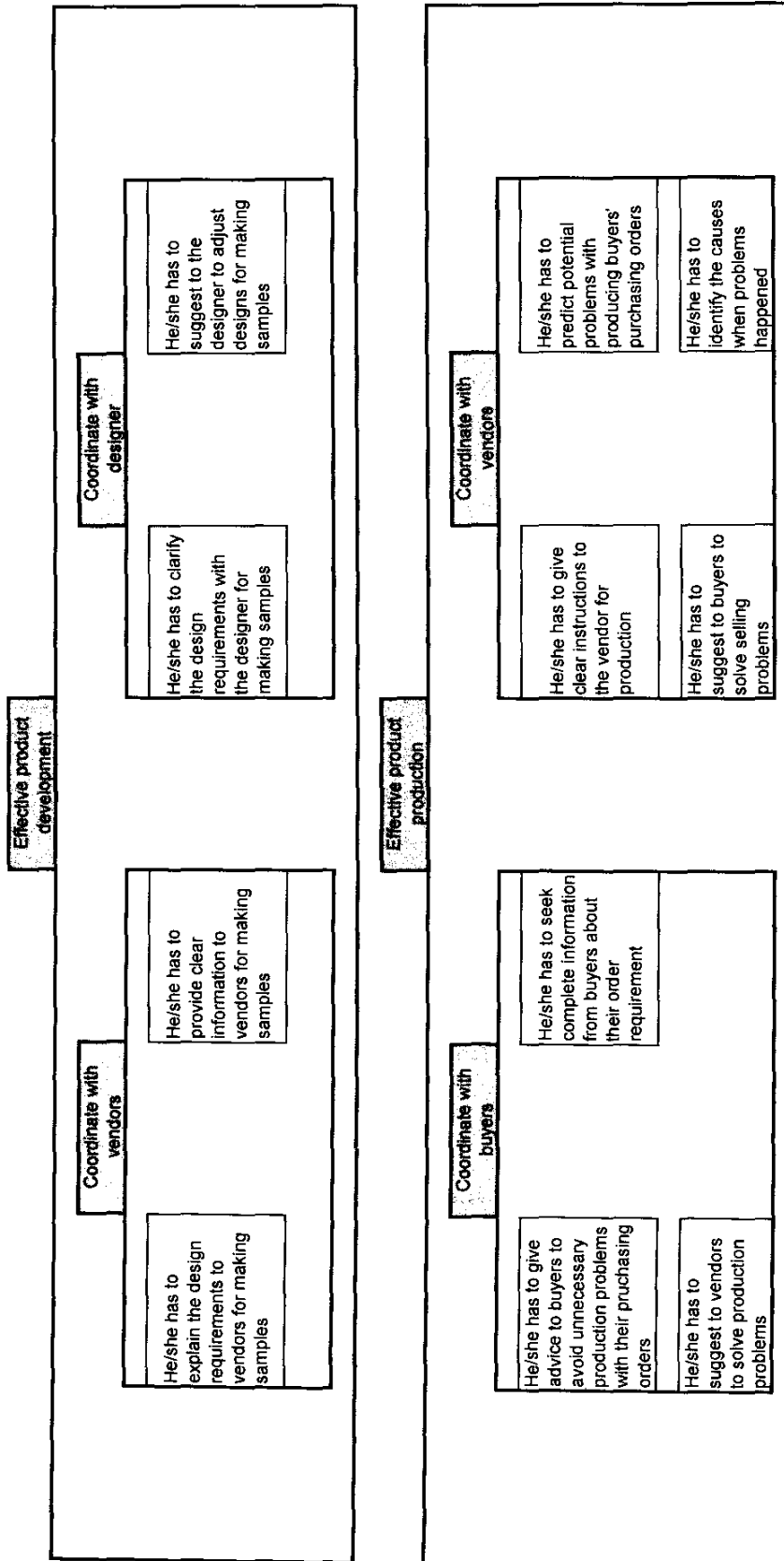


Exhibit 3: Affinity Diagram of the pilot study for grouping the job needs for clothing merchandisers

Customer Needs Hierarchy

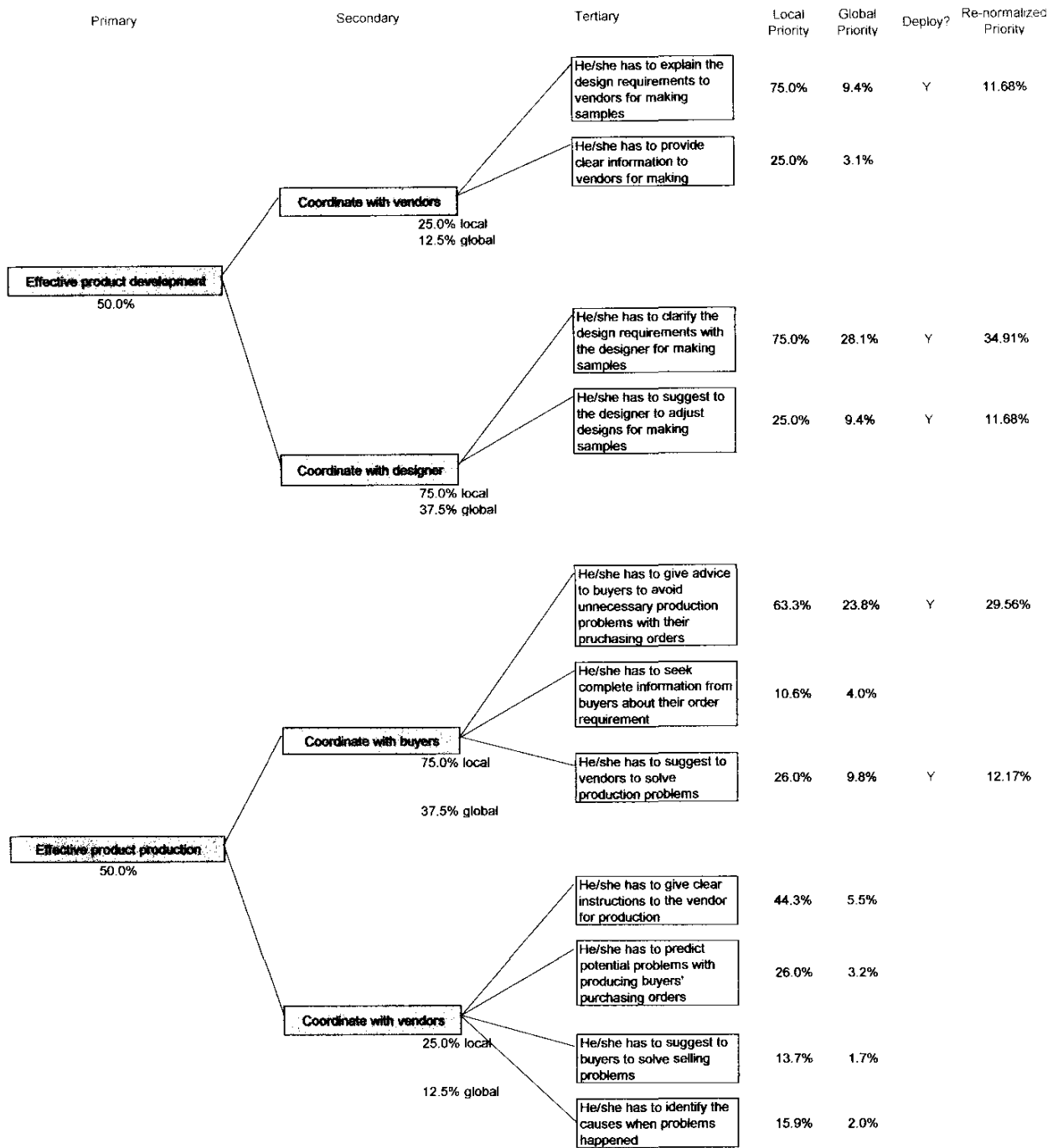


Exhibit 4: Customer Needs Hierarchy of the pilot study for prioritizing the job needs of clothing merchandisers

