

Information Quality to Add Value to Biotechnology

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Abstract

Emerging technologies have a strong impact toward many industries. As one of Emerging technologies, biotechnology has a significant role in driving innovations of other industries; especially researches in the topic of regenerative medicine, which are very important to the society (e.g. stem cell, for instance). Information Technology (IT) helps adding values to industries, but the different thing that IT can help while others cannot is ‘virtual value added from information’. Virtual value added creates virtual value chain in each node of the system. The core of virtual value added is the quality of information, as it is the source of trust from users and leads to the production process in each chain. Therefore, IT is not only a supportive technology like other industries. It is also an important factor in value added process and value chain, both physical and virtual in biotechnology industry.

Keywords: Value Added, Virtual Value Added, Information Quality, Information technology.

I. Introduction

“Garbage in, garbage out” (GIGO), it is used primarily to call attention to the fact that computers will unquestioningly process the most nonsensical of input data and produce nonsensical output. This concept is true; in the digital world, everything uses information technology such as healthcare, tax database, restaurant membership. Of course, they have different levels of accuracy of the information.

Information Technology has influenced many industries [1-2]. Including Biotechnology industry as there is many standards in the process. Those industries need support from information technology in all activities, but biotechnology industry is very sensitive, especially about biological raw materials which should strive to assess and minimize the risk to product quality [3]. New materials may become a product innovation in the market because innovation is the key factor to success for every company [1]. They need to look for the innovative process, services or product for anywhere, anytime, by using all channels to search for more business opportunities.

In this article, we mainly focus on the value added by information technology. The article starts with an overview of biotechnology and biological resources, followed by information technology, information quality, virtual value chain discussion and conclusion.

2. Biotechnology Industry

An emerging technology such as biotechnology has potential to create new industries and transform existing ones [4]. Biotechnology affects several sectors such as agriculture, healthcare, food and pharmaceutical. However, emerging technologies are often painful. Most of the firms have no choice but to participate in the emergent market [4]. Biotechnology is any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use, and biological resources include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity [5]. Despite their characteristic, some biological resources have a less direct effect on social attitude. Take for example stem cells which is found in the cord blood; cord blood is the blood that rests in your newborn's umbilical cord after birth. Other industries are also affected by biological resources; they have a growth rate of R&D and many business start-ups from this industry, for example Cord blood Bank. Cord blood Bank is also a good example of this case because many people know about it and have information from it. A cord blood bank is a place that stores umbilical cord blood for future use, with three activities: collection, processing and storage. Cord blood collection is a simple, safe and painless procedure that usually takes less than five minutes after child birth and the blood is drawn from the umbilical cord in a bar coded bag [6]. After that, there will be the next activities (processing the collected

cord blood and then storing it in a specific storage).

Not only the cord blood been useful, but also human placenta is a source of useful product [7]. Nevertheless, most of the human placenta were disposal. Thailand's doctors have been using the human placenta in researches and treatments for patients; it has also been used in eye surgery as to repair persistent epithelial defect. Although it seems that they take advantage of human placenta, it's just a little one. Human placenta is current issues in Thailand. The argument is all about its process of acquisition, process of utilization, and ethic. Human placenta is then a case study of emerging technology because its value can be created by biotechnology.

3. Information Quality

“Information quality enables trust to the industry.” This concept has always been developed for the trust of banking system. However, the concept is accepted and widely applied in many industries. There are two sides of the concept: system-related and user-related side [3][8]. For biotechnology industry, this concept is regarded as the main component of production system. It is designed to ensure the reliability of information to users, in order to develop the production process. Quality of information is an important matter for user point of view, as it is a chain of connection [3]. For example, the import of ingredients from supplier to manufacturer, if the user of information is manufacturer, he will need information that helps making decision on which ingredient to use. If an ingredient is ensured, manufacturer will transfer the ingredient to other processes. Other processes will later need assurance of information attached with the ingredient, on and on. Consequently, Biotechnology manufacturing process requires a high level of trust. Mismatches among sources of the same data are a common cause of intrinsic concern. Suppliers do not know

the source of data to which problems of quality should be attributed as a problem of believability; this is an example of unreliability [8].

As the results from an interview, we found that trustworthiness of information is very important in collecting samples of human placenta in the process because we must know detail of the mother, such as her antenatal care history, blood group, and medical history. So, constituting valuable input creates trust of process. Information quality is a key to valuable input while intrinsic, accessibility, contextual and representational are the strategies to building trust [10].

4. Virtual Value Chain

As mentioned previously, Information Technology results in effective business process and high outcome rate. These are considered as physical changes; tangible results (e.g. increased sales, quicker operation, decreased loss). Information quality results in create trust of information technology for manufacturing process. They are all emerged from the capacity of information technology and information quality.

Value chain is a value adding concept, of which each activity transfers products from initial supplier to ultimate customer. The concept is well accepted and applied, while IT is an important component in supporting value adding process of value chain. For instance, in industrial production process, manufacturers can check for information on inventory, production or even to investigate the production process. But in fact, people normally do not use information in their hands to add more value to products [11]. They, on the other hand, tend to trust information in the system and apply for their own processes [10].

Value added by information happens when products are produced to consumers;

the raw materials are transferred until they become products. For biotechnology industry, information technology is as essential as in other businesses. Information fundamentally generates immense added revenue. For example, different parts of human placenta can be used in many occasions; cord blood can be used to produce stem cell, Amnion membrane can be used as treatment for patient with eye injury and burn injury and placenta can be extracted for growth factor, etc [7][12]. Case study of human placenta in biotechnology; various benefits of human placenta will not be able to employ by biotechnology without information. Information is necessary for the beginning of value added in value chain process. The checking of mother profile, related profile, tracing back, storage, transportation period, storage period, quality control, etc.; these are all important to pass on human placenta to extraction process or other process. In each transmission, value of human placenta is being added until it becomes medicine. Thus, information transmitted in each activity will add value to human placenta. In other word, value adding is not solely a physical process, but it generates 'virtual added value' or 'virtual value chain' in each node of the system [11]. In the value chain process, raw material through product this activity is physical chain. Moreover, information through information of product this activity is virtual value chain. Of course, these two values must be parallel to create value in biotechnology

5. Discussion

Quality of production is then created by quality of input in each process, this physical input materials and virtual input information [9]. The supply chain approaches events influencing to add value to raw materials in a manufacturing that starts from an initial supplier to a one-tier supplier and the next in the process until the ultimate customer. In transmission, not only will raw materials be

delivered to the process, but also the data transfer. If a one-tier supplier is an ultimate customer, the data must build trust and satisfy them as well.

Trust and satisfaction include manufacturing standard to trustworthy raw materials delivered to a process. In addition, trust in information is being developed into a vitally important topic. Trust is also a key to mediating variable between information quality and information usage, with important consequences for both the producers and consumers [3][9-10].

For these reasons, trust of information of high quality can create value added to human placenta and therefore change the waste into raw material input in terms of biotechnology industry. Moreover, the transmission of information in each activity can build physical value. And trust in each chain can create trust and virtual value chain.

6. Conclusion

Biotechnology industry needs support from information technology in value added process, which is a core of value chain. Hence, the application of information technology in biotechnology industry is indifferent to other industries, only information quality that has to be certified as the nature of the industry itself.

Drug, cosmetic, food, healthcare services or biotechnology products are continuously multiplied. The powerful uses of placenta could be a value added to the biotechnology industry, but the question is about the new source for this industry: is it attractive or undesirable?

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