Creating Creative Cosplay Industry in Indonesia using Vacuum Forming Technology

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***Abstract*—The cosplay in Indonesia initially have not become a trend of creative activity in Indonesia until half of the decade of the 2000s. It is not yet a post-2010 period with the presence of the Jember Carnaval Festival. The cosplay fever in Indonesia is now beginning to end with the presence of cosplayers (people wearing costumes) in various cosplay shows and large-scale presence events. Cosplay costume industry in Indonesia has become one of the economic potentials to contribute and to boost the position of the fashion industry as a contributor to the GDP of non-oil and gas which is currently at the second position of sub-sectors of the creative economy. The use of vacuum forming tool is expected to help improve the creativity of the designer's costume cosplay, and it is expected that with the use of these tools can support produce designs with unique creations.**

Keywords*—*cosplay industries; creative economy; vacuum forming

I. INTRODUCTION

The cosplay in Indonesia initially has not become a trend of creative activity in Indonesia until half of the decade of the 2000s. It is not yet a post-2010 period after the Jember Carnaval Festival. Since then the presence of the cosplay in early 2000 at an event initiated by students at the University of Indonesia (UI). The track record of the presence of cosplay in Indonesia has long been initiated in Bandung Institute of Technology (ITB), which is packed in regular graduation parties held at night in the 'Red Square' yard. Since the decade of the 70s along with the fever of "Memphis Style" which was lively coloring the design style of the young generation in Bandung at that time. The event known as "Fancy-Nite" was attended by students with various styles, such as superhero's replica costumes, western style cowboys, Apache Indian styles, Rambo and The Commando styles and many more style attributes used, depending on the theme carried that year.

In medio in the 1900s and 2000s, when Japanese comics hit among the young generation, especially students in Indonesia. Began to influence events in Fancy-Nite in schools and on college campuses. They mimic the characters in the Manga comic. The production of science fiction stories and movies in the United States frequently hold a science fiction convention. The convention participants wear costumes as worn figures of science fiction films such as Star Trek. American culture has always recognized forms of masquerade as in Halloween and Easter celebrations [1]. The tradition of holding science fiction conventions as far as Japan in the 1970s in the form of the show of costumes (costume show). In Japan, the demonstration of "cosplay" was first held in 1978 in Ashinoko, Kanagawa Prefecture in the form of science fiction convention masquerade Nihon SF Taikai 17th. Science fiction critic Mari Kotani attend the convention with dressing like a character in a story cover image Fighting Man of Mars by Edgar Rice Burroughs. Not only Mari Kotani attends Nihon SF Taikai while air-cosplay. Gainax animation company director, Yasuhiro Takeda dressed as Star Wars characters [2]. Nowadays, almost every month, there is always a cosplay event in Jakarta and major cities in Indonesia. Some regular event is as follows:

- Japanese degree. Usually at the University. Generally at the University of Indonesia.
- Bunkasai. Usually at the University.
- Hellofest.
- Animonster event. Some events sponsored include cosplay events in it.
- Extravaganza, hilarious cosplayer dialogue, Nickelodeon cartoon and anime cosplay Japan put together in Extravaganza at the story titled "Sasuke," Snow White appears next section.
- Anime Festival Asia Indonesia
- Ennichisai
- CLAS: H
- Jakarta Comic Con
- ITGCC

The cosplay fever in Indonesia is now beginning to end with the presence of cosplayers (people wearing costumes) in various cosplay shows and large-scale presence events. Moreover, cosplay is a creative activity that was initially a fad. However, along with the presence of cosplayers in events that are considered to be able to add to the lively every event then can provide extraordinary income in other words cosplay activities become a creative activity with economic potential that can be obtained by a cosplayer. The presence of cosplayers at every presence event today seems to be an obligation that must be fulfilled by every organizer event. Then there is another income from the invitation of the event organizer, who invites these cosplayers to enliven their event. Usually, the event organizer will arrange the meet and greet price, from visitors to take pictures with these cosplayers, and get cosplayer signatures on merchandise sold at the event that. Of course, these cosplayers also get more income through the sale of their merchandise, usually in the form of posters, postcards, or photo books. All of them have economic potential that is beginning to be glimpsed and appreciated by the government as the policyholder.

The popularity of these cosplayers can be seen from the number of fans who follow their social media accounts. So,

not infrequently, famous cosplayers will get lots of offers from companies interested in recruiting them, either become as brand ambassadors or just providing support. In short, today's famous Indonesian cosplayers have become a kind of idol. Their popularity was not inferior to celebrities; the visitors welcomed the cosplayers who defeated the welcome of the pop singer of the capital, who attended the same event. The purpose of this article is to focus on the growth of economic activity as an industry with its economic potential, namely the manufacture of the costume player. For not all the cosplay artists can make their costumes. Most of them hold their costumes from the costume makers. Every costume maker will undoubtedly encounter technical obstacles, especially in the constraints on achieving detailed shapes for each costume he makes. High technical skills are needed, and mastery of the recognition and processing of materials must be mastered. They must always add to the knowledge and mastery of the aesthetic details of the form so that the costumes they produce are similar to the costumes they imitate. One of the technologies they must know, and master is *Vacuum Forming* technology, in addition to other molding technologies. Vacuum forming is a molding technology that can produce various kinds of products with various details of the shapes obtained concisely and easily. Previously, this technology was only owned by manufacturing industries made from thermoplastic sheets and was very high-cost if the order was not very large.

II. METHOD

The method that used in this research is descriptive research emphasizing the library research combining with the evidence [3]. Vacuum forming technology has long been used in the film industry in Hollywood especially in wardrobe industry. The various creations of costume-wardrobe realized with the help of vacuum forming equipment with this technology as the need costumes, such as Batman, Ironman, and Stormtrooper armor. Also. The details of shape on the costumes from a sketch on a piece of paper and intangible and can be applied in any design costumes used.

Moreover, a sheet of hot, flexible plastic is drawn either into or all over the place in a mold with suction provided by a vacuum pump in the vacuum-forming process. It preserves the shape produced by the mold when the plastic cools and hardens [4]. Based on the results of the development of creative plastics product prototypes with vacuum forming method. There are obstacles related to suction power or vacuum power that have an impact on the shape detail with small mold details and sharp angles. Therefore the focus of prototype development focused on efforts to improve the problems obtained.

Fig. 1. The cosplayers use Stormtrooper Armor costumes

Of course, the presence of the costume adds life and life to every event they attend. Costumes with sizes that fit with each cosplayer is a result of production using vacuum forming technology.

III. RESULTS AND DISCUSSION

Cosplay costume making industry generally uses ABS, Ethylene-vinyl acetate (EVA) foam and PVC material as a base material in costume cosplay making. So the main activity in producing a costume consisting of activities; cutting, slashing, filing, and sticking. However, to bring the forms detail using PVC, ABS and PET plastic material as an element of the central accessories vacuum forming technique certainly require weeks to produce the forms with the details as the desired design. In the prototype [5], [6], vacuum forming machines are made later used in the manufacture of two cosplay costume detail by detail the results of the cuff for the manufacture of robot-robot, manufacture helmets with plastic PVC, ABS, detail formation chest field with clear lines. All of them are produced using a vacuum forming device. The purpose of the design is to produce a vacuum forming tool design that can increase the maximum suction power of the air flowing which is intended to produce details on the mold with small and sharp details and angles.

It is necessary to redesign the suction chamber or vacuum chamber in a smaller volume to produce stronger and faster compression on the mold. The methodology used in overcoming the problems as described above is by trial and error method along with the recording of test results. This method indeed requires repeated analysis and design with every improvement in the prototype tool made. Wherein each of the results obtained is then compared. So that in the end obtained the right picture of the design to be refined. Trial and error is a fundamental methodology in problem-solving and knowledge attainment, and the method has been worldwide used in product design and experiments [7]. However, it does not seem to have been formally addressed from an algorithmic perspective. This paper aims to investigate this approach in a broad category of problems with unknown inputs [8].

A. Creative Industries

Creative Industry term first appeared in the 1990s in Australia about the proposal to undertake a radical reform in the field of justification and funding mechanisms related to the policy on the Arts and culture sector. However, this term became more widely known when the British government developed creative Industry. In the 1980s, the English experienced some problems, namely: a high unemployment rate, reduced industrial activity and a reduction in the contribution of government funding for the arts. Then introduced a concept, that culture as an industry. Under this concept, art and culture are no longer seen as sectors which always require a subsidy, but rather is designed to support economic growth and policies related to the development of innovation [9].

The creative industry in Indonesia has become one of the most successful and promising industries since 2002. Seeing the positive contribution in the economy, in 2006 the Ministry of Trade formed the Indonesia Design Power program, a government program of the University of Sumatra University. Sumatra Utara yang whose aim is to

place Indonesian products with international standards and have national characteristics that can compete and be accepted by the world market [10].

Creative Industry needs to be developed in Indonesia because could make significant economic contributions, creating a positive business climate. Also, it could build image and national entity based on renewable resources. It also could push innovation and creativity which is a competitive advantage of a nation as well as provide a positive social impact. Creative Economy is closely related to the Creative Industry, but the Creative Economy has a broader scope than the Creative Industry. Creative Economy is not only related to the creation of economic added value but also the creation of added values socially, culturally and environmentally. The Creative Economy is believed to be able to become the latest economic axis of the Republic of Indonesia in the future. The economic model which tends not require subsidies or massive investments from governments (Weightless Economy) [11], but has a significant impact on the economy (significant impact), is considered to be a new economic engine that brings in massive and systematic anges (revolutionary) [12]. Creative Economy is the creation of added value based on the idea that was born from the creativity of human resources (creative people) and the use of science-based, including cultural heritage and technology.

B. *Creative Procedures*

The initial stage of the creative process to produce a variety of detail required in making a cosplay costume is to draw a rough sketch and then proceed to make patterns on the computer measured using digital modeling software. The intended use of computer equipment here is to generate a print-out images pattern size precision. However, the creative process is mostly done by the makers of cosplay depends on their intuitive abilities. The most common reason they are saying is that the costumes they create a masterpiece or a product made only limited. Sizes varying user establishes the basis of their following. For products with a uniform size and measurable surely they would make the process advance in computer modeling that is used as a reference in mastering the manufacture of molds. Therefore, the cosplay costume creators in their activity in producing a costume have some stages.

1) Stage of making sketches: Freehand sketching is a universal human activity, almost like writing. In everyday life, most adults and indeed almost all children are at least occasionally involved in the production of various kinds of sketches such as road-maps and plans, diagrams and abstract patterns as well as pictions of people, animals, and objects, real or imaginary. Most such sketches should be classified as 'drawings' which are representations of eith direct percepts, or ideas and images held in mind. Artists and designers are among the most ardent makers of drawings: In their professional capacity, they execute a great number of drawings as a matter of standard practice.

Among these drawings, ther a particular category of study sketches which architects have the habit of making in very early stages of the handling of a task [13]. However, sketching is perceived as a non-rational way of learning [14] and artistic activity [15]. Based on the above perspective, obtained a description of that activity in the sketch stage, both rough sketch until the sketches detail is the most important stage of all stages in the creative process. The sketch stage becomes the most important point as a foundation in producing various works. Because at this stage all ideas and ideas are configured in detail and are used as references in the next stages of the process.

Fig. 2. Camara, Lee. Fit in cosplay

Figure 2 above shows the detailed costume made by using vacuum forming. Lee Camara suggesting that "additional sketches are done should the prop have special requirements, like the need to disassemble, safety, convention policies, weight, and other factors [16].

2) Digital modeling stage: The digital modeling stage, at this stage, produced technical drawings accompanied by the assumption of digital calculations using geometric analysis namely, where sheets with geometric marks are calculated. The reference value is obtained for the detailed engineering design in the form of technical drawings to use as a reference at the stage of making a rough prototype. The function of the digitizing process using modeling software at this stage is in addition to generating modeling numbers with precise accuracy. Of course, it is beneficial to be used as a reference in the process of making clay molds to be used as a reference for the molding process later. Other functions are beneficial for production activities with large quantities of production. The digital stage is the rectification of the mind is still in the form of sketches.

At this stage allows making corrections refinement of the desired shape. So depiction results from earlier sketches can be obtained in the three-dimensional visual image. 3D modeling is a stage to prop or costume pieces can be an incredible first step in planning and visualizing build before buying and modifying the stock materials. The modeled every piece of the District 9 Rifle in Sketch Up before starting the actual build. This allowed the cosplay designer to make detailed blueprints that they could lay out flat and plan exactly how much material needed to buy in a plethora of thicknesses [17].

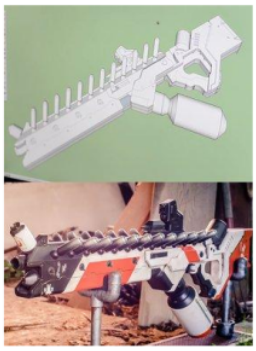

Fig. 3. 3D modeler

The same costume pieces can be created by modeling the parts around a stock human form. They will usually do this when planning large, bulky armor sets so that we can check out the scale and silhouette of the costume and plan our build accordingly. Even if these 3D files are not used for 3D printing or Pepakura, it is still incredibly useful as a visual aid for the costume fabrication.

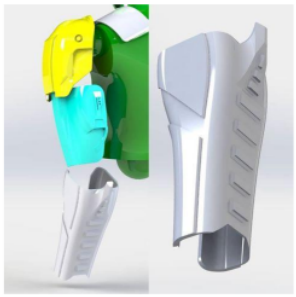

Fig. 4. The 3-Dimensional digital visual presentation of products that will be created using a vacuum forming

Fig. 5. The prototype of Mandalorian armor

Figure 5 above shows the female version processing by vacuum forming methods with PVC material. Based on the process described above from the digital visualization process to the prototype form illustrates that the digitization process is a phase in which various decisions to finalize the form are executed even though it is still possible to be retained until the final form is obtained.

3) Stage of making patterns: At this stage, the entire proceeds of the resulting digital visualization of related dimensions then created the patterns are essentially to be realized in 3D using a clay model of a formation which will result in molding as its pattern. The process of making this pattern requires carefulness in the achievement of details by digital planning.

Fig. 6. The pattern is made to be used as a mold base in the vacuum forming process. This mold is made using a 3D printer machine

Fig. 7. Molding results using vacuum forming with PET plastic material

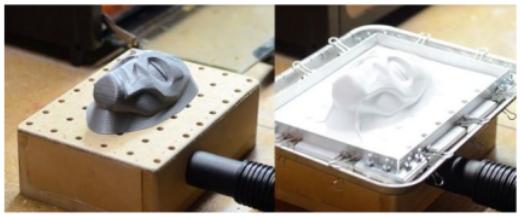

Fig. 8. Using a vacuum forming device is possible to produce large quantities

4) Stage of preparing equipment (tooling): A cosplay costume designer in the production process has prepared all the equipment needed to start producing his creative works. The whole equipment easily is found in his workshop at this stage which is a concern any cosplay costume designers.

5) Material selection stage: In general, the material most widely used by designers in the industry cosplay creative use of EVA foam materials for the primary structure. The use of plastic or thermoplastic material is supporting material for the material accessories with details. Surely they are already well aware of the character of the materials that will be used for their designated purpose.

6) Ethylene-vinyl acetate (EVA): Ethylene-vinyl acetate (EVA), also known as poly (ethylene-vinyl acetate) (PEVA), is the copolymer of ethylene and vinyl acetate [18]. It had some of the properties of a low-density polyethylene but increased gloss (useful for the film), softness and flexibility. Maybe filled, and both filled and unfilled materials have good low-temperature properties and are tough.

Fig. 9. EVA material is the most favorite material used by cosplay costume designers in the creative cosplay industry

7) Acrylonitrile Butadiene Styrene (ABS): Few thermoplastic polymers have as much commercial success as acrylonitrile butadiene styrene (ABS). It has been used for an assortment of applications, largely because of its performance, cost, and compositional flexibility. ABS divides the line between engineering polymers and commodity polymer in both price and performance. Thus, when an application calls for semi-structural rigidity, ABS is a prime candidate over commodity plastics for performance and over-engineering plastics for the cost. Also, there is flexibility in the composition and synthesis that allows tailoring of ABS to specific applications [19]. ABS is currently the most widely used material in many industry manufacturers. Cosplay costumes are included in the creative industry due to the many advantages of these materials.

8) Polyethylene Terephthalate (PET/PETE): The plastic is called polyethylene. Usually, find in mineral water pack, soy sauce bottle, cooking oil, chili sauce, and so on. There are several recognizable features of this type of PET/PETE plastic, such as clear, cogent, solvent resistant, waterproof and gas, and comfortably soft at temperatures of 80 degrees Celsius [5], [20]. Since of the flexibility of this type of plastic so that this material is widely used in industries whose production base uses vacuum forming methods. Included in the cosplay costume industry are the idols of designers when the futuristic design theme. Physical properties of transparent and colored without reducing its physical nature enabling the design combined with a system of layered design.

9) Production stage. This stage consists of activities; cutting, splitting, slashing, filing and gluing, assembly stage, improvement stage, and completion phase. The production stage is the core stage of the whole stage. At this stage, it takes mature production management, related to material selection, selection of production techniques, production equipment selection, the whole set in a tight production flow. Cosplay costume designers generally have determined a part of their design that requires craftsmanship detail with molding techniques or casting techniques. Devices or accessories are detailed details at this stage requires foresight the designer in determining that the device which will be made and the production techniques of how and what equipment is needed. Imitation weapons products, for example, this imitation product will be made in large quantities but limited as needed.

10) Stage of documenting the work: Stages record the works for cosplay costume designer is a highly anticipated moment at the end of production. The aim here is intended to document all stages in the making of costumes to be used as a portfolio and progress reporting an increase in the ability of self as well as a journal entry creation capabilities.

C. Potential Cosplay Costume as Creative Industry in Indonesia.

Based on the Creative Economy Roadmap to Development 2009-2015 formulated in a convention that brings an element of the triple-helix, are; government-business-intellectuals. Then all three converged in parallel formulate the direction of development of creative economic sectors in Indonesia. Related to this, cosplay costume creative industries are classified in the group of the sub-sectors 'Fashion' with the description of the estuary concentration are summarized in the chart below:

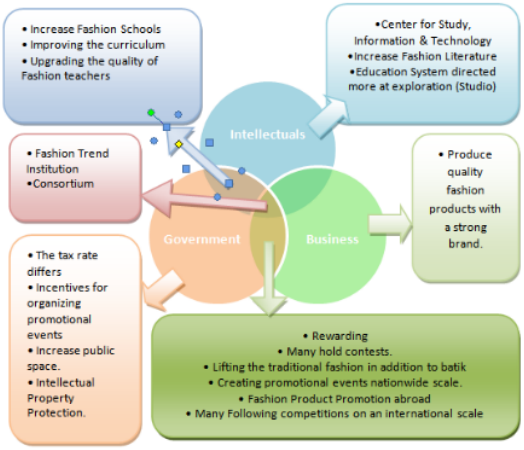

Fig. 10. Diagram 1. Triple-Helix cooperation creative economic development in Indonesia sub-sectors of fashion [21]

Cosplay costume industry in Indonesia is part of the creative economy has the potential of becoming a new industry in the sub-sector of the fashion field has not become an industry. Therefore it is required in order to build a map of its potential to become a creative industry with economic potential. In 2016, the Agency Creative Economy, Republic of Indonesia in cooperation with the Central Bureau of Statistics released a special survey of the Creative Economy 2016 puts the fashion industry is at the second position and become one of the three sub-sectors that outperformed the sub-sectors of the economy other creative (survey 2014-015) [21]. These results are certainly very encouraging in building optimism creative people in Indonesia to continue to develop themselves, to be ready to face the era of Asian Economic Community (AEC) and the readiness to participate in taking part in the industrial era 4.0.

IV. CONCLUSION

Base on the definition creative economy is the creation of added value based on the idea that was born from the creativity of the human resources (creative people) and the use of science-based, including cultural heritage and technology. It is expected that the product of the prototype design of this vacuum forming device can contribute to the growth of the creative economy in Indonesia with a variety

of plastic sheet products, especially for the costume/fashion industry including the cosplay costume industry whose products are produced manually with makeshift equipment. At least, the details of the products into sections detail the main form of complementary accessories and can be met and support the rapid cosplay costume industry in Indonesia.

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