



Research on the Professional Quality of Product Designers in the Context of the Intelligent Era

Yonghui Lin (✉) and Jin Li

Beijing Institute of Technology, Zhuhai, Zhuhai, China
53907024@qq.com, 3834114@qq.com

Abstract. With the arrival of the intelligent era, people's lifestyles, the industry structure and the needs for talents are undergoing major changes. In the face of the large intelligent era coming in torrents, only updating ideas, innovative thinking and self-transcendence can lead the trend. Industry intelligence is breeding a new era, creating difficult and imaginative scientific myths one after another, subverting people's definitions of many things, and creating an overwhelming amount of new business types, new products and new models. In the context of the intelligent era, what should product designers do to adapt to the development of the times? What professional qualities should they have to reasonably harmonize design and ecology.

In the contemporary design field, plagiarism of designs is a common occurrence, which reflects designers' lack of subjective consciousness of worldwide subjects such as the demand of the times, the natural ecology, the humanistic care and the sustainable development. Designers are of varying quality, some products' life cycles are too short, and flawed products are found in the market from time to time. Under the currently mature operating model of the business environment, problems mentioned above should not have occurred. This phenomenon reflects that designers lack attention to a broader scope in the field and are not comprehensively qualified; designers lack a clear design orientation, and the products they design fall short of a good market prospect; designers' sense of social responsibility and social services is not strong, thus failing to give their product designs any detailed care; and the products designed lack ethical characteristics and local color. In the new era, product designers should have some major qualities as follows: (1) they should give full play to their sensible creative ability and develop their artistic talent; (2) they should seek new development in the multi-dimensional perspective, subject collisions and cross-border experiments; (3) they should design their works on the basis of solving practical problems; (4) they should do a comprehensive research on products from the perspective of the society and services; (5) they should master the ability to harmonize the five major elements, i.e., technology, materials, usage, structure and modeling; (6) they should have a future-oriented (sustainable) learning ability, a comprehensive quality and an innovative design ability; (7) from the design service object, individual per se should be studied rationally and objectively through philosophical theories of anthropology, psychology, phenomenology, etc., and meaningful designs should be made on the basis thereof; (8) they should draw cultural self-confidence, heritage and integration, extension and creation from China's own traditional arts; and (9) since the large

data era required us to solve problems in a more comprehensive, reasonable and accurate manner through resources sharing and joint efforts, it is particularly important to cultivate design teams' sharing, cooperation and innovative collaboration abilities.

Keywords: Intelligent era · Professional quality of product designers
Sharing · Sensible creative ability · Cross-border · Care · Sustainable
Traditional culture

1 Introduction

With the skyrocketing development of high and new technologies, the artificial intelligence (AI) has come to the forefront of the times and constantly subverted human being's imagination in more and more industries. Let's look back on year 2016: Microsoft Tay made outstanding performance in the field of perception. AlphaGo defeated with utmost efforts the great grandmaster in the global Go community. Google, Facebook, Amazon and Twitter rapidly changed their strategic directions, establishing core AI team successively..... Up to the beginning of year 2017, AI system Libratus developed by Carnegie Mellon University won four world top Texas Hold'em Poker players. This is a hot concept promptly igniting various industries. Domestic and overseas magnates of science and technology make arrangement successively. IDC predicts that AI market scale will exceed USD \$47 billion in 2020. Moshe Vardi, a professor of Computer Science at Rice University, ever alleged, "AI will take over 50% of the current jobs in the coming 30 years around the globe." In addition to application to some subdivided industries such as finance, medical treatment, transportation and intelligent life, AI starts to be involved into the field of design creativity. For example, Tailor brands releases a special algorithm system that can automatically design logo and raise design suggestion. Voice interaction designer prevails in Silicon Valley. Wix launches AI system ADI that performs automatic web design... It seems that AI triggers a technological revolution in the field of design.

Can AI really replace designers' work in future? The answer is no. AI can replace most repetitive and mechanical work and even participate in design, but it cannot take the place of designers. Technologically, AI can strengthen aesthetic judgment through constant learning and simulation. However, human being's emotion and cognition path are evolved through tens of millions of years, and their inherent creativity and pursuit of aesthetics are what AI is unable to understand. Therefore, what professional qualities should designers have to truly connect with future design and meet new challenges brought about by the intelligent era?

2 Analysis and Argument of the Professional Quality of Product Designers in the Intelligent Era

2.1 Liberation of Sensible Creativity Is Core Competitiveness of Designers in Future

Dancing with shackles on, designers give full play to their own creativity within certain rules and regulations. 70% of designers express that the proportion of their own repetitive work is less than 10%. After AI comes into the field of design, what will happen when sense and sensibility meet? AI can complete repetitive work and simple “creation”, liberating designers’ brains. In future, the distinctive originality and creativity will be core competitiveness of designers.

On April, 27th, 2017, Design & Artificial Intelligence Report prepared by “Tongji x Tezign Design & Artificial Intelligence Laboratory” was released at Alibaba’s user experience design summit UCAN. The report considers that design industry belongs to “co-evolutionary” process of man-machine essentially; in addition, the creativity of human brain is provoked infinitely as machine can help people undertake more repetitive work. Design needs AI to assist co-evolutionary process of “human brain - machine”. The report investigated intelligent design cases of advertising industry, clothing industry, high-tech industry in which design is involved deeply and occupies larger proportion and collected back more than 1,000 questionnaires from designers in these industries [1].

This report arrives at the overall brain machine ratio in the design industry in 2017 was 1.55 by collecting a large number of survey samples of the field of design. As displayed in Fig. 1, it’s a compound proportion of brain machines of designers on different tasks. Red figure is time distribution proportion (%) of designers on different tasks. Green figure is possibility (%) that different tasks are replaced by intelligentization. During designer’s work in next three years, nearly 61% of work is in certain need of human brain and the automated possibility has appeared in 39% of work.

Through investigation and analysis, conclusions are drawn as below:

1. Designers with whatever types and experience all need collecting materials and processing information. “Collecting materials and processing information” occupy nearly 30% of designers’ workload. In addition, this proportion will not get reduced with the increase in years of working.
2. Although designers always complain of hardship or fatigue, design is not physical labor. Approximately 70% of designers believe that “repetitive physical labor” in their work is less than 10%, and even nearly 40% of designers think that “repetitive physical labor” in their work accounts for less than 5%.
3. Originality and creation will become the most core competitiveness of designers. From the vertical forecast of Mckinsey model and comparison of horizontal relationship between originality and creation and brain machine ratio, we can see that human designers need such abilities as management, originality and creation, and communication to continue to stay competitive after machines can undertake more work.

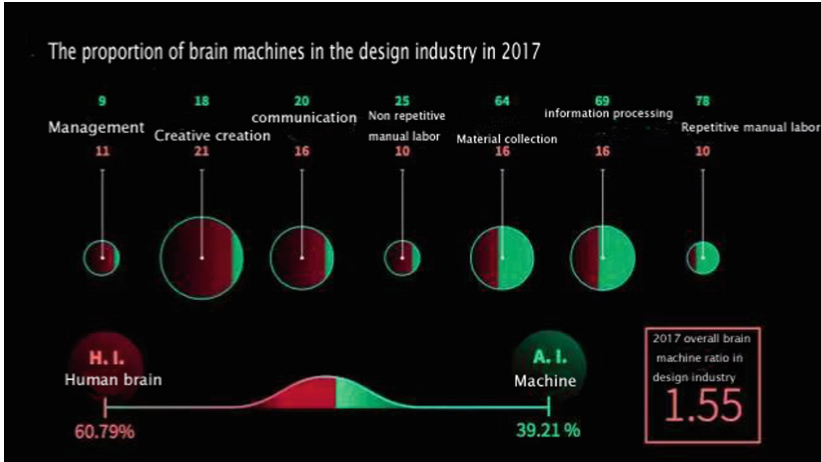


Fig. 1. 2017 overall brain machine ratio in design industry

With the development of science and technology and popularity of in-depth learning, the increasing occupations will be replaced by AI in future. Designers are not exception either. AI can rapidly adapt to various software, output design materials at the fastest response speed and perform design in strict accordance with design specifications without mistakes.

In such a “splendid” era, where is our competitiveness? Sensible creativity cannot be replaced by machines. Only by liberating sensible creativity can designers truly get rid of experience and concept in the design and machine-like duplication and design. Each of us has all kinds of different tags, which are related to our growing environment, people and things we contact, and our likes and dislikes. AI neither undergoes such cultural accumulation and life experience nor feels it. Good at discovering the details in life and summarizing, we exert our advantages to apply cultural factor to design and make design become interesting and connotative. Therefore, sensible creativity is a basic professional quality of designers in the new era.

2.2 Designers Should Seek New Development in the Multi-dimensional Perspectives, Subject Collisions and Cross-Border Experiments

Cross-border design will be a development trend in the future. An aspirant design agency or designer should be brave to be cross-border, attempt breakthrough and use mixed design and cross-border design for the purpose of providing high-quality service for clients instead of confining thoughts and hampering initiative.

Case one: The vintage of red wine is usually indicated on the bottle label. However, how many people can really understand the meaning of the year in which grape is harvested? Actually, the vintage mainly indicates natural conditions of red wine becoming mature, and so to speak, is a biography of red wine. However, in recent years, with the extensive use of insecticide and balance spice, the vintage labeled on the bottle loses its meaning gradually and the taste of red wine becomes ready-made product gradually. It's not related to actual weather conditions in that year.

In order to design label for Piquentum St Vital, Sonda Studio makes an attempt to help people improve awareness to understand the importance of the vintage of red wine. Therefore, Sonda Studio collects weather conditions of the region in which red wine chateau is located and simultaneously records annual precipitation by cooperating with Croatian Meteorological and Hydrological Service (DHMZ). The precipitation has been verified that it is an effective data directly revealing yearly climate variability. Designers use bold dots with different size as a sign of standard precipitation to directly display the precipitation of each particular month in one year. The whole label indicates all-year weather conditions. Therefore, it can be compared easily with different years. See Fig. 2. In this way, red wine as one of the most popular products in history is also a kind of medium displaying the importance of understanding the nature. The cross-border cooperation between designers and the DHMZ make products more humanized.



Fig. 2. Design label of Piquentum St Vital

Case two: WANG Boqiao is a founder of normal design and DAC Interactive Technology (Beijing) Co., Ltd., creative design director, council member of CDS, chief planner of China Digital Art (DAC), and also creative consultant of National Museum of China and independent art curator. “Beconer” UVC PLB is a classic cross-border design among many works designed by WANG Boqiao and his team. It’s an honor for a designer to work on this because “Beconer” UVC PLB will serve the pilot of home-made carrier-based aircraft. See Fig. 3.

Viewed from a general survey, “cross-border” prevalent in the design community makes the boundary between different fields of design increasingly obscure. Many new



Fig. 3. “Beconer” UVC PLB

interesting collisions are generated and more new possibilities of design are brought about due to “cross-border”. It’s not only reflected in cross boundary of design industry. Design is allowed to enter into people’s life. Such “cross border” arisen from collision reaction between design and society probably make people more excited. Additionally, a deep understanding of China’s traditional cultural deposits is also an important reason for those great designers to be able to stand erect in the global design community.

2.3 Designers Should Design Their Works on the Basis of Solving Practical Problems

Design focuses on solving problems and embodying values. Oki Sato, founder of Japanese design powerhouse Nendo Studio, said, “If only conspicuous part is decorated slightly, you can earn design fee without effort as long as clients feel satisfied with it.” “Such design does not have any technical content. Its characteristic cannot be manifested. It will only become worse and worse and cannot grow stronger in the long run.” In the design process, designers should stand in users’ perspective to discover and solve the problems, deeply understanding clients’ demand. Design cannot go without life and market, needing to be beautiful, complete and better respectively in form, function and economy. This process reflects designers’ value and enhances the value of design products as well. Besides, designers should have a strong awareness of social responsibility instead of only focusing on the promotion and improvement of design towards commercial value. As designers have a sense of social responsibility, they will consider whether it’s forward-looking and environment-friendly in the industry in the design process. Under this premise, the most essential design is to make use of the most appropriate technology to solve the problems. Humanistic care and value improvement have a maximized embodiment. As displayed in Fig. 4, people’s feelings in the process of using it are fully considered in the design of the coffee pot. By recording preference of different groups of people, palm-print recognition is used to provide personalized service. In Fig. 5, trash can with quadrilateral open design allows usually unused plastic bags to be put in for the purpose of the utilization of waste materials. It’s convenient to be stored and used. The protruding parts at both sides in style design can be used as handles and also fasten rubbish bags in use. It’s an intelligent design and has practical function.



Fig. 4. Coffee pot uses palm-print recognition



Fig. 5. Discarded plastic bags are to understand personal preferences of making fully used. Such trash can is both coffee easy to use and environment-friendly.

2.4 A Comprehensive Research Is Made on Products from the Perspective of the Society and Services

With the development of human society, value, aesthetics, human concept of modern people have a great change. From the perspective of various benefits, human feelings become more and more indifferent. Such society gives designers more missions. They consider their design constantly from the perspective of humanity, hoping to evoke people's attention to humanity. Design is always in desire for serving more people and satisfying multi-directional demands of the people.

Elie Wiesel noted that "human nature dose not only lie in their desire for truth but also in the sense of mutual assistance and responsibility." An analysis of the vulnerable groups from the perspective of principle of design art is conducive for us to deal with the problems facing design of vulnerable groups in modern design, see clearly design of vulnerable groups, and further find the essence of the problems in multiple contradictions so as to perform design of vulnerable groups better and weed through the old to create the new.

Design is meaningful, especially those made for vulnerable groups.

Great efforts are made for the design of the vulnerable groups from product design to design atmosphere in modern design. The wheelchairs are improved from ordinary ones to the ones controlled by thinking now. Various facilities are designed for the vulnerable groups in public place such as children's amusement park, the seats specially arranged for the vulnerable groups in public bus, sidewalk for the blind, bathroom for the disadvantaged people. In addition, there is camera designed for the blind and the design for the vulnerable groups in immaterial design. For example, as user name is registered, verification code needs to be input. There is a pattern of trumpet nearby verification code. This is a design made for the convenience of the vulnerable groups.

As displayed in Fig. 6, Elevated Bathtub is designed for the elderly, disabled and pregnant people. It comprises two parts: up-and-down movable bathtub and shower with pedestal (simultaneously act as an important role of track). Before Elevated Bathtub is used, its bathtub stays at upper side. As users come to the area of shower, they get it lowered to the bottom by choosing bath mode. After that, water will fill the bathtub gradually. Now users can take a bath. After use, Elevated Bathtub will automatically discharge water through exhaust water pipe as long as bath mode is shut down and then rise to original place. In Fig. 7, designers add a tangent plane with a reasonable angle at the bottom of ceramic lavabo to increase flexibility and multi-functionality of the product and make it more pleasant. As the disadvantaged people and children use it, they can adjust the bathtub to proper angles. This design is full of love.

The era is changing but care remains unchanging. Design is to create more reasonable life-style for human being. The comprehension of such value cognition and judgment as well as practical application to the practice of creating the things about design is to care not only for creating the things but also human civilization. We are living in the world designed by ourselves and, because of our own design, will own an unknown but certain destination corresponding to our design.

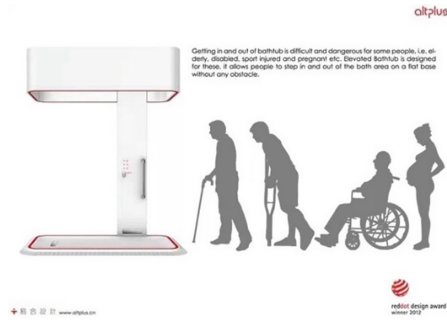


Fig. 6. Elevated Bathtub



Fig. 7. Un Lavabos

2.5 Designers Need to Have a Future-Oriented (Sustainable) Learning Ability

The environmental issues and energy problems are increasingly prominent today. The sustainable development theory is universally valued. The sustainable development design means that a full use of modern science and technology is made to develop vigorously green resources and cleaner production, and constantly improve and optimize ecological environment so as to facilitate harmonious development between man and nature, and inter-coordination and mutual promotion of population, resources and environment. The sustainable development design is actually to bring the sustainable development theory into the field of design. It can be applied to almost all fields of design from construction and urban planning to production and industrial manufacturing. Such innovative design philosophy requires designers to integrate, analyze and optimize some key elements such as environment, society and economy in every step of design process. For example, designers are required to be able to predict performance of design, compare different schemes, anticipate the influence on the environment, and simulate implementation process and so on in the process of the sustainable development design of construction. Only by realizing these in the development stage of design can the environmental destruction and waste of resources be effectively avoided.

How does this world make sustainable development or connect with the change in life-style of sustainable development? We have to admit that the ability to deal with complexity, ambiguity and uncertainty gets greatly improved after computer appears. Computer system can allow the world to become more transparent and create more

collaborative opportunities. Everyone has a good user experience. After a good user experience is created, the world is probably pushed to a certain direction. Hopefully this direction is certain to be sustainable development.

The influence of the design stage in the product development process on final products reaches 70% because many relatively key choices need to be made in this stage: cost, appearance, material selection, innovative point, performance, environmental implication and quality. The quality includes product life, durability, and repair-ability and so on. It can be seen that product designers have an unprecedented opportunity to intervene and affect the impact of products on environment and society (See Fig. 8).

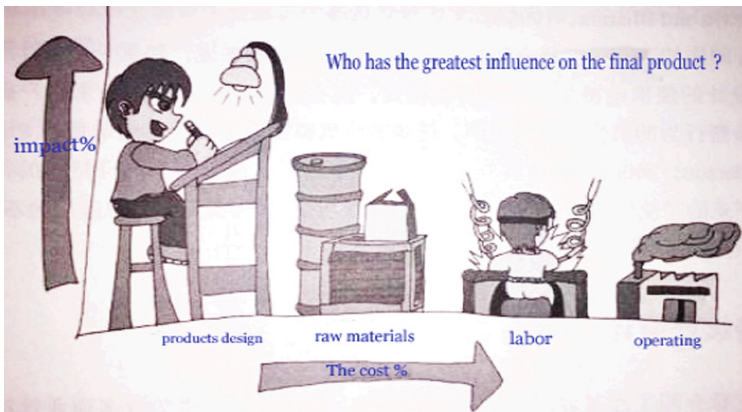


Fig. 8. Influences of product designers on product development

The sustainable design provides a new and broad environment for the field of design. When Birkeland (2002) raised a new version of design concept, she summarized as below:

- Responsibility — The target is re-defined relying on demand. Social/ecological equity and justice are paid attention to.
- Synergy—A positive synergetic mechanism is established. The systematic change is promoted from all kinds of different elements.
- Background—The significance of design convention and concept on social transformation is re-evaluated.
- Entirety—An analysis is made from the perspective of the whole product life cycle to make sure that design results are really low-impact, low cost and multifunctional.
- Authorization—The development of human being's potential and self-sufficient ability as well as understanding of ecological problems are promoted in an appropriate manner.
- Restoration—The integration of civilized society with natural world is made to cultivate an interest and curiosity.

- Ecological benefits—The tenet is actively positioned at the level of increasing energy, materials and economy of cost.
- Originality—Representing a new kind of paradigm, it can transcend traditional boundary of subject ideology to reach a “new realm”.
- Vision—Focusing on vision and results, it imagines the appropriate method, tool and process to deliver them [2].

Therefore, every designer should have a future-oriented (sustainable) learning ability, starting with *per se*, jointly changing our living environment through sustainable design.

2.6 Designers Should Draw Cultural Self-confidence, Heritage and Integration, Extension and Creation from China’s Own Traditional Arts

Given its immense influences on the development of modern art design, traditional national culture has become an integral part of the former. It is an indispensable spiritual treasure of Chinese people. Traditional Chinese culture accumulates abundant national cultural materials for our nation in the cultural precipitation process of 5,000 years. It’s mainly reflected in such various aspects as Chinese characters, traditional spirit, traditional graph, ink painting and artistic conception, and traditional handicraft art. Although China’s native art design has made some brilliant achievements in recent years, its effect is barely satisfactory. Under the circumstances that globalization tendency rapidly predominates in the contemporary society, China’s modern art design does not only need a regression of “tradition” and “indigenization” but also keep pace with the times so as to connect with the world and carry it forward simultaneously. This is a kind of reflection of China’s designers on traditional national culture, and even a sort of responsibility. What’s good is that Chinese people have a deep recognition of traditional culture. In such a modernized society, what we need to do is not to abandon it but to try all means to put Traditional Chinese culture into modern elements and make a good presentation. Although it’s seen from the outside that they are only some symbols and forms, these symbols and forms exactly reflect China’s cultural spirit of 5,000 years if they are understood truly [4].

Art design constantly goes deep into diversified cultural atmosphere. The abandonment of a shadow, narrow and prejudiced cognition of China’s traditional cultural education cannot be made only relying on simple connection and indiscriminate imitation but deeply understanding quintessence and soul of traditional culture. We advocate that high-level works with ethnic flavor are truly designed by integrating traditional culture with modern design, combining aesthetic taste and thinking mode of modern people and retaining art essence and national aesthetic features of China’s native design. A broad horizon and creative spirit should be owned to actively absorb all fruits of excellent culture in the world. Only triggering creative inspiration from national culture and art based on profound knowledge of cultural background and unique view can designers create the works belonging to the nation and becoming astonishing masterpieces, more and better art works, and serve China’s socialist modernization construction.

Figures 9, 10, 11, 12, 13, 14, 15, 16 and 17 are illustration design works for utensils made by the students majored in visual communication design at Beijing Institute of Technology, Zhuhai. It's inclined to be emphasized in class training that Traditional Chinese culture is taken as elements to make design. While taking tradition for reference, they represent new charm of their works by combining with the elements of times vividly.



Fig. 9. Illustration designs for utensil of robes series in Qing Dynasty



Fig. 10. Traditional dermatoglyphic pattern series



Fig. 11. Dunhuang frescoes series



Fig. 12. Aspiration series



Fig. 13. Facial makeup and cartoon series porcelain series



Fig. 14. Chaozhou-Shantou embedded



Fig. 15. Chinese plants and dermatoglyphic pattern series



Fig. 16. Overseas Chinese hometown “Kaiping”—gourmet and watchtower series



Fig. 17. Chinese zodiac series

Designers should master the ability to harmonize the five major elements, i.e., technology, materials, usage, structure and modeling.

Because product design is a practical subject, the cognition and understanding of materials play an important role in product design. It cannot only remain in the ideas. Designers need to consider the feasibility of implementing the ideas and enable them to be made in mass production, guaranteeing the integrity of original ideas. The relations between materials, craft, structure, usage and style design in the design are interactional. A kind of design promotes the improvement of craft sometimes, and a sort of new craft and new material can react upon the design so as to upgrade the design sometimes. It's a kind of means for designers to master the knowledge of arts and crafts materials. That serves the design. Designers need extensive basic knowledge of materials to guarantee the feasibility of implementing the design. In addition to cognition of basic knowledge of materials such as physical property and chemical attribute, they need to supplement the cognition of place of origin, price, use and surface texture besides material performance for the purpose of arousing desire for use of creation. They need to pay attention to the relation between materials and form in craft, understanding molding law of general materials and limitation of materials technology on the form. Additionally, they can remedy the shortcomings and defects of materials and craft by relying on excellent design.

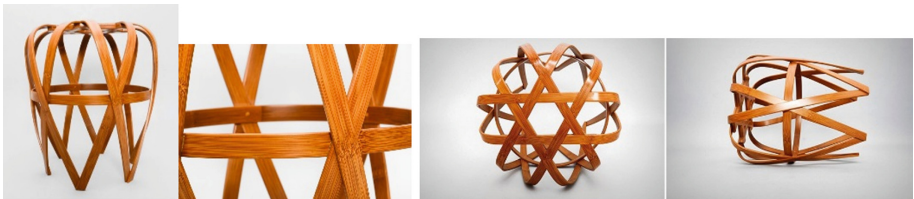


Fig. 18. Woven bamboo stools by Cheng-Tsung FENG, a Taiwan designer

As displayed in Fig. 18, they are woven bamboo works from Taiwan designer named Cheng-Tsung FENG. Such ancient traditional materials as bamboos are given new vitality and vigor in the hands of younger designers. The perfect combination between traditional craft and modern aesthetics does not only unfold the aesthetic perception of bamboo wood per se but also allow the people to see that it's a spring of inspiration. The modeling and structural design with crossed net rack can completely

bear the weight of human body. Five major elements, i.e., technology, materials, usage, structure and modeling are harmonized perfectly in the works.

2.7 The Mode of Sharing, Cooperation and Collaboration Will Become the Working Style for Designers in the New Era

At present, with the dramatic outburst of such technologies as internet, big data, AI and cloud computing and significant breakthrough of cloud technology particularly, an earth-shaking changes occur in the whole industrial design community. The internet brings us the possibility of collective collaboration. The blind design mode with one person or one isolate team will change. The open-mindedness and sharing culture of “Internet + cloud” will make designers’ soul crash into each other. Consequently, more intelligent sparkles are generated.

China has implemented the policy of 「Made in China 2025」 actively in recent years. CIIF held currently in Shanghai naturally becomes the focus of attention of global industry. Among it, 「Uni-Orange」 newly established within two years has successfully attracted the attention of industry and media in globally initiative sharing mode of industrial design.

The Internet of Things breaks the fence of various industries that scarcely intervened each other or had less intersection in the past, allowing the industry with the parallel operation to start to ponder in a vertical way. However, it’s not easy to make an interdisciplinary development in a short time. Therefore, the enterprises usually assist themselves make development by virtue of external resources or in a way of releasing resources. For example, Advantech makes overall arrangement of cloud service industry focally developed in next stage with 「co-creation」 strategy, becoming a propellant of this industrial development in a form of alliance. For the enterprises with small scale, high R&D cost and deficient technology, the way of sharing resources that is just like a burst of timely rain allows the enterprises to obtain the most appropriate resources under the limited conditions.

Uni-Orange, founded in 2015, has demonstrated to the outside a collaborative R&D design cloud platform CDS (Collaborative Design System), initiating the collaborative industrial design mode of [industry +cloud]. Through the sharing resources platform, Uni-Orange enables customers to solve their problems by outside resources. Using the concept of cloud platform, CDS connects designers, engineers, and technology experts from different areas, and carry out R&D designing works by means of division of labor and collaboration, which can bring holistic industrial design solutions for enterprises with inadequate technology support.

For enterprises with inadequate creative ability, all global elite designer teams may be for their use, satisfying their needs for product creativity, and solving problem such as R&D costs and technology barriers. By the mode of collaboration and cooperation, the R&D designing efficiency of Uni-orange is two to three times higher than that of other counterpart product companies who are using the traditional mode. While the running mode of this platform enables customers to submit the needs waiting to be fulfilled after registering on the official website of Uni-orange. CDS platforms will assign the right human resource to customers, and tailor a feasible solution plan. Even if sometimes customers do not have a understanding of what products they really want,

but only a vague requirement, the professional team and instruments on CDS can rapidly assist customers to discern problems, and put forward the outline of designing plan pertinently.

The most heated topic now is “sharing economy”. The former phase of sharing economy focuses on labor sharing and idle resources sharing, while the later should focus on intelligence sharing and creativity sharing. The former is like a physical process while the later chemical action, which means a new value is derived from the integration of resources. For example, the chemical action of integrating user, designer and manufacturer is that the user puts forward needs and pain point, the designer figures out solution plan for the pain point, and the manufacturer immediately judges the feasibility of the plan. New commercial mode will be derived from sharing intelligence. For example, if the consumer point out an absolute pain point and the designer puts forward an excellent solution plan, they can totally own the copyright of the product and royalty from sales, since the product belongs to every participant. Even in the future, the genuine brand, even the industry can be shared.

Since 2004 when the enterprise owns over 1,000 staff, LKK has ranked the top in the industry. Looking at the data for the whole industry, there are 160 million people taking the job of designing, which means that a resource of 150 million designers in this industry is available. How to share this resource? Today, our theme is AI. AI can optimally help people to improve working efficiency in some fields, and free some repetitive work. Just as physical sharing and human resource sharing, LKKer is such a platform for “brain sharing”, where the ideas of every common user and every designer can generate maxim value.

Back to the innovative design for products, the traditional method is that with their designing experience, designers like to habitually put his experience into the designing works. While in AI era, it is difficult to help an enterprise to carry out industrial upgrade if the designers do not have an understanding of market, technology, or the products are made without the support of big data. Therefore, on the basis of AI and big data, LKKer platform is in assistance of designing for enterprises by a new mode. With all designers on the platform providing product data support, and industrial data support, users can design the product together with designers. For enterprises, instead of enterprises’ technology deciding products’ definition, it is the combination of users’ needs, users’ scenes, users’ values and innovation power of the designer that push enterprises to do industrial upgrades.

Therefore, the mode of sharing, cooperation and collaboration will be the major working mode for designers in the new era.

3 Conclusions

In conclusion, under the background of intelligent era, what professional qualities should a product designer possess to genuinely go with the future design, and face the new challenges brought by the intelligent era? This essay elaborates on basic requirements for professional qualities of product designers in eight major aspects. First, through the analyses for Design & Artificial Intelligence Report written by “Tongji x Tezign Design & Artificial Intelligence Laboratory”, it’s ensured that in the

future, the originality and creativity of product designer will be designers' core competence; second, through two cases, one of which is the cross-border cooperation between Sonda Studio and the DHMZ to design the label for piquentum st vital with the whole label showing the weather of the whole year, it is certain that cross-border can well satisfy customer's needs. Thus, designers should be equipped with the designing abilities for creativity through the multi-dimensional perspective, subject collisions and cross-border experiments; third, by the case analyses for the designs of coffee pot and trash can, it can be concluded that function is more important than form. Therefore, designers should base their design on solving practical problems; fourth, from the analyses from the perspective of social responsibility and significance of design, designers should care for the vulnerable groups from the perspective of society and services, and design for love; fifth, in order to solve the problems of the environment we live by and energy problems, designers should acquire a future-oriented (sustainable) learning ability; sixth, take the example of the course assignments for the students in Beijing Institute of Technology, Zhuhai, the Chinese culture is broad and profound, therefore, designers should draw cultural self-confidence, heritage and integration, extension and creation from China's own traditional arts; seventh, by the case analyses of works of woven bamboo stools designed by the Taiwan designer Cheng-Tsung FENG, it shows that designers should master the ability to harmonize the five major elements, i.e., technology, materials, usage, structure and modeling; eighth, with the overwhelming explosion of technologies such as Internet, big data, AI, and cloud computing, taking the example of Uni-Orange Design and LKK companies, it is demonstrated that designers should have the consciousness and abilities for sharing, coordination, and cooperation; ninth, through the analysis of third item, the design works of designers should solve practical problems. The foundation to solve practical problems lies in the analysis and comprehension of the designing objects. From the design service object, designers should study individual per se rationally and objectively through philosophical theories of anthropology, psychology, phenomenology, etc. This conclusion can provide theoretical guidance for the cultivation of professional qualities for product designers in the new era.

References

1. Fan, L.: Design & Artificial Intelligence Report 2017, Tongji x Tezign Design & Artificial Intelligence Laboratory (2017)
2. Bhamra, T., Lofthouse, V.: Design for Sustainability—A Practical Approach. China Architecture & Building Press, Beijing (2017)
3. Russ, T.: Sustainability and Design Ethics. Chongqing University Press, Chongqing (2016)
4. Jiao, C., Zhang, X.: A Brief Analysis of Influences of Traditional Chinese Culture on Modern Art Design, Today's Massmedia, August 2014
5. A Research on China's Intelligent Manufacturing and Design Development Strategy. Zhejiang University Press, May 2016
6. Norman: The Design of Everyday Things, China CITIC Press, Beijing (2016)
7. Yu, Y.: Cross-border Thinking: Practices of Interaction Design. Zhejiang University Press, Hangzhou (2016)
8. Sato, O.: Solve Problems with Design. Beijing Times Chinese Press, Beijing (2016). (Japan)

9. Kant: *The Practical Anthropology*. China Renmin University Press, Beijing (2013). (Germany)
10. He, S., et al.: *Materials and Processes of Product Design*. Publishing House of Electronic Industry, Beijing (2014)
11. Xun, S.: *Source and Stream—Traditional Culture and Modern Design*. Jiangxi Fine Arts Publishing House, Nanjing (2007)