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**Factors Affecting Creativity in the**  
**Product Design Industry**

According to the ICSID<sup>1</sup> (International Council of Societies of Industrial Design), "Design is a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life-cycles. Therefore, design is the central factor of innovative humanization of technologies and the crucial factor of cultural and economic exchange." I propose the use of this definition when discussing theories of design throughout this paper. It may be that concretely defining the process restricts the act of creation, but I suggest to the reader that this definition is a net used to catch all creativity. Not all creative acts are pertinent to product design, so product design must be defined in order to discuss those creative acts which do aid to its progress.

In the early 19<sup>th</sup> century, craftsman made their wares by hand. As demand increased however, it became evident that a method of production was required that had a higher throughput than traditional manual methods. Originally, the aesthetics of machine-made products were adapted to mimic their hand-made predecessors. German architect Walter Gropius broke from the standard in 1919 when he envisioned an aesthetic that incorporated forms which could only be produced by machine. While the hand-made aesthetic still exists today, the machine aesthetic surpassed it as the standard in the product design process. Interestingly, this aesthetic was a result of the technology used to make the products – and it therefore morphed with the ever-changing manufacturing technologies. In 1963, the SKETCHPAD system was released from MIT by Ivan Sutherland. This machine is considered the beginning of current day software used to design the elaborate shapes we see in today's products. This category of software is called computer aided design (CAD). With the advent of CAD, objects could be designed quickly and efficiently, as well as accurately and effectively. Any

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<sup>1</sup> "Definition of Design." [www.icsid.org/about/about/](http://www.icsid.org/about/about/).

conceivable object can be accurately recreated on the computer, and subsequently physically reproduced in a matter of hours.

The freedom of CAD, combined with amazing possibilities in today's manufacturing processes, grants product designers a new release from the old rules. These rules were hindrances to creativity that prevented some mechanisms and products from ever being created. While a brilliant mind might cope without the support of digital modeling software, the principal issue at this stage of design is the support of a team of creative minds. Digital modeling allows an individual to clearly and efficiently disseminate their ideas to a group. Many people are involved in the transition from idea to object, all of whom need to completely understand the structure of the product in order to aid its creation. CAD allows those creative ideas that were once too complicated to describe to reach production. The message could finally exist as its native medium, as Marshall McLuhan<sup>2</sup> would say.

So here we are today – able to create just about anything we can conceive. With this hurdle lowered, the focus of industrial design can be philosophically analyzed on the basis of its driving force and only remaining hindrance: creativity itself. Because of the inherent subjectivity, creativity can be defined in many ways. I suggest, for the purposes of this paper, to define creativity as thinking that produces novel and practical ideas.

While the preceding definition may suffice for this paper, Albert Rothenberg<sup>3</sup> suggests that "The problem of creativity is beset with mysticism, confused definitions, value judgments, psychoanalytic

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<sup>2</sup> McLuhan, Marshall and Fiore, Quentin. *The Medium is the Massage: An Inventory of Effect*. 1967. New York: Bantam Books.

<sup>3</sup> Rothenberg, Albert. *The Emerging Goddess: The Creative Process in Art, Science, and Other Fields*. 1979. University Of Chicago Press; Reprint edition (December 15, 1989)

admonitions, and the crushing weight of philosophical speculation dating from ancient times." There are countless ways to define creativity in varying ranges of specificity. Margaret Boden<sup>4</sup> of the University of Sussex, drawing on ideas from her work in artificial intelligence, suggests that creative ideas are those which cannot be produced by the same set of rules as familiar ideas. While this does not compete with the aforementioned definition, it may help to illuminate the process through which creativity happens.

On the creative process, Irving Singer<sup>5</sup> of MIT writes:

“It is through our facility to learn that we become creative. Each develops through time, and reason augments the creativity in learning by also operating within temporal parameters instead of supervening upon them.”

I believe that these ideas concerning the creative process tie in well with the theories of psychologist Raymond S. Nickerson<sup>6</sup> of Tufts University. Nickerson discusses various techniques that are proposed to foster creativity. Developed through both academia and industry, his methodology appears effective, particularly with exposure at an early age.

1. Establishing purpose and intention
2. Building basic skills
3. Encouraging acquisitions of domain-specific knowledge
4. Stimulating and rewarding curiosity and exploration
5. Building motivation, especially internal motivation
6. Encouraging confidence and a willingness to take risks
7. Focusing on mastery and self-competition

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<sup>4</sup> Boden, Margaret. Routledge. *The Creative Mind: Myths and Mechanisms*. 2<sup>nd</sup> edition. November 4, 2003. Ch1.

<sup>5</sup> Singer, Irving. *The Creative Process*. Unpublished. Revision: May, 2007. p5.

<sup>6</sup> Nickerson, R.S. (1999). Enhancing Creativity. In Sternberg, R. J. (Ed), *Handbook of Creativity*. (pp. 392-430). Cambridge University Press.

8. Promoting supportable beliefs about creativity
9. Providing opportunities for choice and discovery
10. Developing self-management (metacognitive skills)
11. Teaching techniques and strategies for facilitating creative performance
12. Providing balance

It is useful to explicitly distinguish between creativity and innovation. While creativity is commonly used to refer to the act of ideation, innovation generally implies both the generation and application of creative ideas in a specific context. When used within the context of a product design firm, innovation describes the entire process by which the firm generates creative ideas and molds them into novel and practical *commercial products*, whereas creativity tends to be restricted to an individual or group as a subset of the innovation *process*. It is important not to confuse this process with the similarly termed creative process.

While creativity has long been studied by philosophers, I feel that the design industry has not adequately pondered the philosophical underpinnings of the term itself. Too often “creativity” is used in the context of product design without considering the deep philosophical and sociological aspects that come with its use.

With a greater understanding of the creative process, the leaders of design industry can produce the newest and greatest products with greater efficiency. Greater efficiency in the design process yields products both less expensive and better featured. The underlying importance is that products provide more value to their consumers if they are produced efficiently. The efficiency of the process also correlates to higher materialistic gains for the designers. It can be argued on nihilistic grounds that these purposes are mute, but I will avoid wading into this discussion. Taking consumerism as scientifically as possible –

there is money to be made, and the individuals working in the product design industry have places to spend that money. Let this be their purpose, being careful to separate it from the purpose of the consumer, who ultimately feels he or she needs to consume the designers' goods for reasons that I address in subsequent paragraphs.

The modern-day product design industry descends from the manufacturing industry, an industry that is vanishing from America. It's a trend pervading the US, driven both by customers hungry for unique products with enhanced functionality and by increasingly experienced and inexpensive foreign manufacturing production facilities. Product design is the old manufacturing industry transformed to the new service economy. And while it leaves behind most high school and college degree-lacking line workers, engineering has found a new calling as more companies consult with design firms like IDEO, Lunar, and M3 or even start their own design branches. Product design is the new 'in' thing, spurred by materialistic customers looking for the best experience possible.

In a sense, product design has always existed in the form of innovation, from inlaid wood to the wireless card, but the artistic nature of product design has been overshadowed by the concrete, logical manufacturing requirements. Because of this, it has been difficult for companies to justify design costs for aesthetic treatments that would not definitively increase profits.

Bill Breen<sup>7</sup> talks about Whirlpool's design chief, Chuck Jones in his article, "No Accounting for Design?" and his idea for the addition of injection-molded ornamentation to spruce up a Kitchen-Aid refrigerator design. The suggestion would add about \$5 to the unit cost of the

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<sup>7</sup> Breen, Bill. "No Accounting for Design?" Fast Company 1 Feb. 2007: 38-49.

refrigerator, and there was no way to prove that this would bring increased revenues to the company, so its resource-allocation department shot the idea down. Jones, in the wake of this rejection, created a formal evaluation process to apply quantitative value to aesthetic improvements, but the growing trend among companies is to trust designers when they tell their clients or employers that the product looks good, and will therefore sell well, mainly because designers are gaining a larger percent of control of the industry – a result of manufacturing leaving the country.

Beyond any choice made by Jones or the Whirlpool company, there is very little that can be done to change the driving force behind decisions like these. They are made by the company because all decisions are subjected to a cost-benefit analysis. What impact this analysis has on the creativity of product design needs more background to be seen clearly.

In this book “Art of Thought,” Graham Wallas<sup>8</sup> suggests a 5-stage process through which creativity occurs: preparation, incubation, intimation, illumination, and verification. In the following examples of design firms and their methods, it can be seen that these processes are assumed to happen on their own, because it is assumed that these firms employ creative individuals, but this is not always the case.

Alessi, a Milan design factory specializing in relatively low-tech home furnishings, has taken the design-for-looks approach to a new level. The unique designs featured in their products help keep a strong customer following. In his article, “Innovation through Design,” Roberto Verganti<sup>9</sup> describes Alessi’s isolated approach to design. Unlike the high

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<sup>8</sup> Wallas, Graham. *The Art of Thought*. New York, Harcourt, Brace and Company [c1926]. pp.225-314

<sup>9</sup> Verganti, Roberto. "Innovating Through DESIGN." Harvard Business Review 1 Dec. 2006: 114-122.

profile firms of the US, Alessi designers – who are generally chosen world-wide by Alberto Alessi depending on the project – are told to forgo the limiting ties of customer needs and purpose and focus solely on the looks of the product. Designers for Alessi often work alone and on their own time schedule, each generating his or her own take on the prompt given by Alessi. The results of the individual design process are publicly announced before the final design is chosen. High class boutiques around the world put the designs on display and public feedback is analyzed to help choose the design that will go into production.

Companies like IDEO follow a very different method of product design that is surprisingly structured considering the innovated solutions they have sculpted. In order to fulfill their client's needs, IDEO engineers from varied backgrounds begin by working together in small groups, observing and researching the project. This observation could be anything, from pretending to be a patient at a hospital (with a hidden video camera) to following users around and watching them interact with a product. After information is gathered, the group participates in brainstorming. A good ideation session will yield a hundred ideas per participant in an hour. Prototypes of the ideas are created to help identify how the solution might work, and are generally hacked together simple demonstrations. James Pethokoukis<sup>10</sup> talks about a session with Gyrus ENT in his article "The Deans of Design...." IDEO was not making progress in their discussion with the medical engineers from Gyrus about the surgical tool they were attempting to improve. An IDEO engineer left the room briefly and returned with a whiteboard marker, film canister and clothespin stuck together. The simple prototype conveyed the idea that the designed were trying to explain, and progress immediately resumed. This and following sessions yielded many

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<sup>10</sup> Pethokoukis, James M. "The Deans of Design; From the Computer Mouse to the Newest Swiffer, IDEO is the Firm Behind the Scenes." U.S. News & World Report 2 Oct. 2006.

prototypes. The prototypes were slowly refined into a single product, taking into account customer needs, and that product was finally sent to market.

I took a class called 'Product Design Processes' which taught relatively standard industrial design methodology, very similar to the methods IDEO uses. In the class, there was no attention paid to getting outside visual consultation on the final prototypes. This seems to be the case with most US design firms as well. The standard US industrial design process does not focus on aesthetic design. The process is rapidly moving toward aesthetic-based design, and while IDEO is an exception, the real focus for firms like IDEO is creativity in innovative use of physical mechanics, spatial analysis, and consumer needs. It is a more scientific approach that leaves the aesthetic to the end of the design process.

When I first learned of the Milano and Western schools of design – that is, Alessi and IDEO – I assumed they were in conflict, one very nearly the opposite of the other in methodology. It is important to discern which works better and which allows for freedom and creativity while still yielding progress. In investigations of the end products of Alessi and IDEO, I quickly realized that they are not conflicting at all. In fact, they compliment each other.

While IDEO tends to innovate through design, Alessi designs – or re-designs – products whose components are classic. One immensely popular product by Alessi was a tea kettle. The kettle sported a bird-shaped plastic widget on the spout that whistled sweetly when the kettle began to steam. Aside from having beautiful curves and ingenious metaphoric undertones of morning and wakeful activities, the kettle was simply a kettle, and even kettle whistles have existed since antiquity. It could be argued that this is not a creative endeavor on the part of Alessi's

designers, but the kettle exhibited creativity in the aesthetic, just as art is considered aesthetically creative. In a sense, a large part of the design of a product is the aesthetic.

IDEO engineers, meanwhile, innovated a new way to get dirt and crumbs out of carpet. They worked together, on their hand and knees – as Pethokoukis relates – playing with things until something worked. The idea was made into a manufacturable product and sent to market. The non-electric carpet cleaner is not a new idea, but the way IDEO engineers decided to do it is.

Alessi's design success works simply because he has cut out the real industrial design work and deemed it trivial work given to engineers behind the scenes. The visual aesthetic of the product is the main focus, and this is something that a creative, visual designer can handle without support. In reality, would it not be better to stack the two on top of each other, innovate first, design aesthetically second? Why not use the standard industrial design process to get a product that works on a functional level, then consult with architectural and graphic design types who don't necessarily work for the company about the look of the product?

I feel that this approach would cause issues simply because components of a product require space that may be excluded by the creative aesthetic designer. The best approach seems to be to have people of both backgrounds working in parallel, and, taking this a step further, to have people of as many backgrounds as possible working in parallel on different aspects of a single product.

Along with find new ways to gain attention from end-users, design firms will need to carefully consider factors like employee composition and location and their effect on the creative process. Creativity is

arguably partly gained from genetics and partly from the environment, and if any aspect of creativity is gained from the environment, it is important to take these factors into account.

As suggested, companies like IDEO employ the most diverse backgrounds possible, from biologists to anthropologists to artists in order to attack problems from many directions. Alessi, on the other hand, primarily uses architects for the inspiration of its creations, yet the creativity in products is very diverse. How necessary is it to have varied backgrounds in employees if companies like Alessi are able to exhibit diverse creative output? This categorization is a misinterpretation. Alessi hires architects from all over the world, and – while they may have studied similar subjects in college – they all have very diverse backgrounds. So, varied backgrounds are key to the success of any design firm.

The location of the firm is important not only to attract many different types of people, but also to provide a creative living environment. IDEO is in sunny California. Alessi is in beautiful Milan. What if a company were in New York or Boston? Living environment can have a large effect on how people think, especially if they do not want to live there. One unpromising region that comes to mind is the finger-lakes region of upstate New York. With one of the slowest growing economies in the US, and a relatively high unemployment rate, nearly a third of its new residents over the past ten years have been prisoners. Yet this region has been home to big names like Xerox, Bausch & Lomb, and Eastman Kodak.

I propose that the single most important ingredient in the creative process of product design is not the methodology, the location, or even the product being created, but the individuals. Truly creative individuals will no doubt refine the process they traverse, as they will make the best

use of their surroundings, and the best designs of whatever product on which they are working. I do not suggest that things like location and type of product cannot help the process along, but ultimately the greatest influence on the success of a product design company is a brilliantly creative core.

Creative individuals, as Teresa Amabile<sup>11</sup> of Harvard University argues, should express expertise, creative thinking skills and motivation in order to enhance creativity in the business world. While expertise is gained in school, motivation and creative thinking skills can be largely affected by environmental perturbations.

It is the creative individual that can be the most use in an industry such as this. Unfortunately, as Professor Alan Lightman<sup>12</sup> at MIT puts it in his essay *Prisoner of the Wired World*, we are living in a “wired world.” To see how this is a problem is to see the problem itself. Today, more than ever, we go through our time just bumping into Mr. Ravioli – from working on the job, to answering emails, to phone calls, business lunches, researching for following reports and deadlines – to a point that it seems the amount of work to do will never end. In the past during the industrial revolution, increased technology meant increased production, which meant less time at work, but because of the cause and effect loop of consumerism and production, technology has become a means in itself, and our work weeks have actually increased. Sociologist Juliet Schor<sup>13</sup> reported in her book *The Overworked American* (1991) that the average American worked an average of 160 hours more each year in 1990 than twenty years earlier, and the trend has not leveled off since.

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<sup>11</sup> Amabile, Teresa M., Sigal G. Barsade, Jennifer S. Mueller, and Barry M. Staw. "Affect and Creativity at Work." *Administrative Science Quarterly* 50, no. 3 (September 2005): 367-403.

<sup>12</sup> Lightman, Alan. "Prisoner of the Wired World." In *A Sense of the Mysterious: Science and the Human Spirit*. New York, NY: Pantheon Books, 2005, pp. 183-208.

<sup>13</sup> Schor, Juliet B. *The Overworked American: The Unexpected Decline of Leisure*. 1991. Basic Books, New York, NY. p37.

It may not be immediately obvious that this is a threat to creativity., but thinking back to childhood days of bliss, and what I called then boredom, I remember when I could let my mind spin freely, without friction from deadlines and other engagements and I wonder what I have lost by not having that time. Lightman believes he has lost something of his inner self. By inner self he means the part of himself that imagines, that dreams, that explores, that is constantly questioning who he is and what is important to him, and I agree. As we increasingly spend our days connected to the wired world, we lose something of ourselves, and that something is the very thing needed to be the most creative. The very characteristic most desired of a product design engineer.

If a company consists of individuals who are concerned wholly with deadlines and producing results as quickly as possible, then what of the company itself? If the company cannot listen to itself, how can it listen to the wants and needs of its clients?

Product designers need to challenge the basic supposition that technology equals progress. The real path from technology to progress is a winding path in the dark forest that so often has lead to progress that the path between the two has been forgotten, and they are assumed to reside directly beside each other. Those who get lost in the woods are forgotten and not considered. Why?

I do not feel that there is any breach in my logic concerning the lapse of judgment of an entire country on the meaning of progress. Just as slaves were once thought inferior to their masters, all evidence points toward the idea that technology equals progress, and the best way to get there is to work as hard and as long as possible. The reason individuals have difficulty changing this view is three-fold.

First, we are utterly socially consumed by interest in materialistic wealth. This causes increased consumerism, which requires increased productivity, and sets into motion the cycle in which many Americans find themselves caught. This is a very easy cycle to break, spend less and therefore work less. The interesting caveat for the product design engineer in this situation is that by working less, he or she may actually become more productive because he or she will have more time to come up with more creative ideas. Unfortunately the cycle must be broken for any possible gains to be appreciated.

Second, a lapse in productivity is equated to falling behind from a competition perspective. This is inexcusable. Working less may temporarily cause a decline in productivity, which may lower profits. Companies today are measured by their profits as much as their products. The photography of Guido Mocafico – large prints of complicated and extremely beautiful watch mechanisms – is not well known because while the art he produces is creative, but in too low a volume to reach the public. Numbers speak to public ears.

Third, product design engineers are just that: engineers. The engineering doctrine is one of order, efficiency, and productivity. High duty cycles and low energy loss are among happiness and sunny days in the minds of engineers. Stopping work in order to be more efficient tends to seem illogical.

On the second point I find issue. Concern for economic gain over all else, while a just and logical motivator or progress, tends to defeat the purpose of the creative process because it steers one's thinking in the direction of progress for progress' sake. I believe that truly creative acts will lead to progress, and by breaking the attention given to a materialistic focus one can easily yield the benefits of such progress.

Leaders of the product design industry's companies have two choices: modify the working environment to foster creativity, or hire individuals who have already chosen to lead their lives in a creative way. Alessi and IDEO owe their success to the implementation of both of these options, but not intentionally. Alessi designers are accomplished architects that have proven their creative abilities, and generally they work in an environment that best suits their version of creativity. Because most of Alessi's designers work from afar, each 'employee' has a different definition of his or her ideal working environment. In the case of IDEO, creative individuals are sought out, and employees are encouraged to proactively change their environment to suit their creative needs (even if it involves going on 'field trips' to find creative inspiration).

There are various arguments against the factors that affect creativity in the product design industry. It can be argued that the creative people required for the product design industry serve diametrically opposed causes. They are required to live calmly and reflectively in order to be as creative as possible, while they design for a materialistically consumed society. This is not the case, as the creative people designing for this society are also its members, and therefore can also be consumed by materialism. As mentioned before, however, product design engineers should be able to maintain distance from the bustle of the wired world in order to allow their creativity to flourish.

The standard industrial design process is formulaic. Because of this, it is easy to argue that this process is merely a crutch in order to help those who are not truly creative survive in the product design industry. Creativity is not intended to have guidelines to its process, and each product is different, thus the process used to design it may also need to be different. Fortunately the standard industrial design process puts little restriction on the creative process itself. It could, however, be

argued that the innovative process, which is strictly controlled by the guidelines set forth in the standard industrial design process, suffers because of these guidelines. I agree with this argument, but I feel that the type of person needed to produce products effectively in a real business cannot be realistically employed by any one company in a quantity that will allow that company to turn a profit. The standard design process is a compromise that has a proven history of allowing design firms to stay in business.

Improvements in both efficiency and employee quality of living can be obtained through careful consideration of economy, business structure, location, knowledge background, and individual creativity factors. Of these factors, the foundation of the entire industry depends on the unfettered creativity of the individual and his or her ability to bring that creativity to fruition. In the future, the leaders of the product design industry will be those that foster creativity with a strong focus on the knowledge that creativity is a deep and philosophical concept that is easily affected by modern socialistic trends.