product development
technologies, inc.

PULSE

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In this issue:

Asian Design: A Look at the Landscape

This is the first in a series of articles outlining global shifts in design and innovation and the emergence of a creative economy on a global scale.

Over the past decade, PDT has consulted with hundreds of firms, from fortune 100's at the forefront of their industries to entrepreneurial startups. In the process we've seen the impact that developments in the Asian economy – particularly China – have had on these businesses, both good and bad.

The transition to Asia as the world's low cost manufacturing hub is long settled, and PDT was among the first product development consultancies to recognize these opportunities and respond with on-the-ground guidance for our clients by providing vendor selection and manufacturing support. While this was a painful period for many, on the whole the majority of PDT's clients adapted to this sea of change and embraced the ability to compete with quality products at significantly reduced production costs.

We're now at the beginning of a new phase of Asian economic development, one which has the potential to impact your business in new and perhaps more challenging ways. There's been much buzz about the "rise of Asian design" and the potential for Asia to become a new powerhouse in innovation as well as production… this would again transform the playing field for many of our clients.

But like much that's been written about the growth of Asia in the world economy, there are many realities which don't make for the best headlines, and thus don't get reported with the same enthusiasm. With that in mind, we'd like to share our insights about what's really happening there.*

* While the focus of this article will be on China, many of the trends we're seeing apply to a lesser degree in India and other Asian growth centers.

Rise of the Asian Consumer

The raw numbers are staggering. With a population of 1.3 billion vs. the United States' 300 million, the sheer quantity of potential customers for goods and services should scream "opportunity" loud and clear.

Indeed sales in China of everything from electronics to automobiles have soared. In 1996, Chinese consumers owned about 7 million cell phones in comparison to the US's 44 million… by 2003, the tide had turned; about 270 million Chinese owned them versus 160 million Americans. Since 2000, Chinese consumers have similarly outpaced Americans annually in television and refrigerator purchases.*

* Some of the data cited in this article is a few years old as newer numbers are not always readily available. The magnitude and trends have nonetheless continued on course through 2008.

Personal income per capita in urban China has risen more than 10% annually for the past five years, resulting in significantly increased purchasing power. Such power is now allowing consumers to be more selective, with their expectations becoming less influenced by cost and more by their individual and cultural needs and desires.

Not Just a Sweatshop Anymore

Ironically, as workers demand a better quality of life and new lifestyle experiences, the low cost production environment that got China where it is today is itself starting to face real competition from even lower cost domestic and overseas providers - sparking an immediate requirement to broaden expertise beyond cost advantage in order to sustain a growing economy.

This has been recognized at the highest levels, and action is underway on the ground to execute on this challenge. China's most recent five year plan, for example, cites "Independent Innovation" as one of the central themes put forth for the nation's economic development. He Renke, Chair of Industrial Design at Hunan University, has said that "Our goal is to transition from 'Made in China' to 'Designed in China'."

Asian governments, businesses and schools are investing heavily to develop their capabilities at

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the front end of the product development cycle; they are wholeheartedly embracing the notion that innovation is the core of sustainable economic growth. An oft cited statistic is the massive growth in Chinese design education; the numbers vary, but most agree that China now has more than 300 schools offering design programs, graduating approximately 10,000 new product and graphic designers each year (up from just 1500 in 2000).

The Indian government also just ratified a national design policy intended to make design a “national priority” - clearly indicating where they see growth - while Korea is chomping at Japan’s heels with high profile brands like Samsung and LG, focused on connecting with users worldwide through design and innovation. Taiwan’s HTC, once an ODM for western brands, has emerged as a global brand in its own right, succesfully investing heavily in innovative user experience and design to grab market share from established competitors.

Growth of Asian Product Development
Product design and development is becoming a growth business in China. Design consultancies (many staffed by the recent graduates cited earlier) are popping up in major cities, and US firms have begun to set up shop in Beijing, Shanghai and Hong Kong. It’s true that much of the “good design” coming from China to date has largely been an emulation of the west with some tailoring to local needs… but that’s starting to change.

Lenovo Yoga Tablet PC

The growth that should concern our clients the most is probably going to come from corporate design departments of manufacturers in industries from PC’s to housewares. The size and quality of these design departments – and the corporate support that drives them from the highest levels of management – far exceeds what most western firms have sought to develop, and their design vision is starting to find a market worldwide.

Lenovo, for example, (which purchased IBM’s laptop business in 2005) has developed what is by all counts a world class design team from local and international talent with which they have quickly built a brand that they can market to the world. To date the firm has won over 10 BusinessWeek / IDSA design awards, 35+ awards from the Industrie Forum Design, the Japan G-Mark International Design Award, the German IF International Design Award, CHIPS Magazine Annual Product Award at CEBIT, etc. and the list continues to grow. Haier Group, one of the world’s largest manufacturers of white goods, is another example of successful Asian design focus. They established their industrial design department in 1994 and their refrigerators, dishwashers and air conditioners have since gained increasing shelf space at stores like Target and Walmart. They employ a team of over 100 designers, with an additional 25 reportedly dedicated to user research.

While firms like Lenovo and Haier are currently the exception rather than the rule, China’s future in this regard may well be seen in manufacturers like Samsung and LG from neighboring Korea, which are well on their way to dominance over US firms in many of their respective markets. Samsung is now regarded as one of the world leaders in cutting edge consumer electronics (and last year overtook Motorola as the world’s second largest cell phone manufacturer).

Similarly, Kia Motors has transformed from the equivalent of the Korean Yugo to a genuine competitor for Toyota in just a few years. And looking to the western half of the continent, India’s Tata Motors – which has developed some incredibly forward-thinking small vehicles that will

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soon be aimed at markets beyond India - just purchased Jaguar from Ford.

So what does all this mean for PDT's clients? PDT has been closely following these developments, and while we won't claim to have all the answers, we have established a balanced, holistic perspective based on our extensive experience in product development and long standing participation in Asian economic growth. We look forward to sharing these insights with you in a future issue of PULSE, where we will explore the challenges, realities and opportunities ahead.

"Do you dare to stay out? Do you dare to go in? How much can you lose? How much can you win?"
(Dr. Seuss, The Places You'll Go)

-Joel Delman
Can't wait two months for our next issue? If you would like to talk to Joel about this subject, please contact him at joel.delman@pdt.com

Special Recurring Series:

Get to know our team...

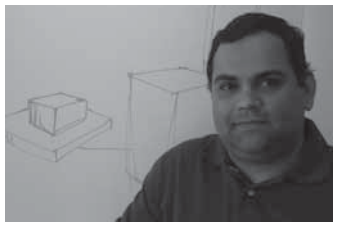
Where Do You Find Inspiration?

When designing for the medical industry specifically, my number one inspiration is the realization that my contribution can help save lives. The fact that a family member, friend or even I may one day be subject to the experience or effectiveness of this device is very humbling and inspirational.

From a more tactical standpoint, I always first take a look at the size of the product; there are three basic sizes: small (fits on a tabletop, in the hand, etc.), medium (typically sits on the floor, comes to the waist or so), and large (you can't see the top- takes up a lot of space in the room). When dealing with the small and medium sized products, I often look to the automobile industry for inspiration in styling. Auto styling in my opinion is the most free-form and limit-pushing out there. I also seek out products doctors have grown accustomed to using everyday outside of the exam room- mobile phones, mp3 players, laptops- and see how those items of luxury and convenience can translate into advances in the exam or operating room.

The largest medical products, however, have very different challenges. For these, I like to turn to architectural inspirations- how do I make this large piece of machinery fit into a room, work with the building structure, wiring and electric, while creating a safe, comfortable and user friendly environment?

Goldie has been integral in many medical product development projects in his 10 years as an industrial designer. He has been a part of the PDT team for two and a half years since moving to Illinois from his native Bangalore, India.



Pro/E Vs. Solidworks

PDT is known as one of the largest users of Pro/Engineer, a 3D CAD parametric feature solid modeling software, in the world of product consulting. With 50 licenses, 80+ users and more than a million hours of Pro/E experience collectively among our team, we've truly earned that reputation. In recent years, however, we've had more clients requesting databases created by Pro/E's competitor, Solidworks, as their end deliverable, and we've grown our Solidworks expertise to meet that need.

With a great deal of confusion in the market about the relative strengths of each of these CAD software packages, we decided to talk to three of our mechanical engineers to compare the two side by side. Bjorn is a Pro/E expert from our Chicago office, Steve a Solidworks master from Lake Zurich, Illinois and Stanislav is our switch-hitter for both teams, working from PDT Ukraine.

Bjorn: In the past we always used Solidworks sort of begrudgingly. We learned it on the fly… we'd start the work in Pro/E, then our counterparts in Ukraine would convert it into Solidworks. The way it progressed through PDT was great, though, because it made for fantastic training for our Ukraine team, who are now top-notch Solidworks experts. Now, if a client uses Solidworks, we'll start there rather than in Pro/E because we have team members who are experts both in the US and abroad.

Stanislav: That's right. It was a crash course in both of the softwares as well as effectively and efficiently communicating with overseas team members. In my opinion, Solidworks is intuitive and dare I say simple. Pro/E is more advanced with a huge amount of optional licenses and opportunities - strangely, though, there's still no polygon feature in Wildfire 2…
You don't have to read a manual to figure Solidworks out. On the other hand, you wouldn't learn Pro without a manual or a good teacher.

Bjorn: The biggest downfall of Solidworks in my opinion is the inability to share geometries and features across parts. Pro has a master part so all your outside surfaces, location of keys, features, sketches, datum points, axis- anything- can be shared among all of your (potentially thousands of) parts.

For a candy bar cell phone, for example, there's a battery door that comes off. When the battery door is put on there, it needs to be smooth and integrated and exactly matching up with the back surface of that cell phone. If you can create all that geometry in one location and have it shared into the housing and the battery door, you can guarantee that the housing matches the battery door and that they're all based off of one thing. In Solidworks, you can do that, but it's almost rudimentary compared to the way Pro/E handles it.

Steve: Solidworks will carry surfaces, planes, solid geometry and axis. It won't let you share curves, but the work around is instead of a curve, you extrude a millimeter surface.

Bjorn: That's really clunky. I think for serious projects, that's a big negative.

Steve: I'll give you that the whole concept of a master part is not as developed in Solidworks as it is in Pro/E. This is definitely one area in which Pro/E is superior. However, it is easy to get used to defining features and sketches in assemblies in Solidworks. So external geometry and surfaces can be defined in a master model and then split off, assembled in a master assembly, and have features added to them in the context of the assembly.

Stanislav: Pro/E has more sweep options and surfacing is much easier.

Steve: You're right… there are issues with lofts and sweeps, but Solidworks TRYS to make things work. In Pro/E, you just get errors. I like that at least an attempt is made even if you do end up with some funky surfaces at first.

Stanislav: Pro/E is complicated but it allows you to do any geometry you want in it; you just have to know how to do it. I actually think Solidworks is

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strong in solid features and surfaces but weak in drafts and rounds.

Bjorn: Pro/E's surfacing is better because there are some things you can't do in Solidworks. In Solidworks, there tend to be issues with lofts and sweeps if they aren't smooth. If they have edges that don't match up to what you're lofting to, you get those funky surfaces. I think it's worth noting that a number of our industrial designers work in Solidworks occasionally. There's a stigma that goes along with Pro/E that the learning curve is steep, but Pro/E changed their user interface drastically in the last six years. They went away from the menu picks and tried to pull a lot out of the menus out into icons. I think it's more intuitive now.

Steve: Engineers are typically trained to be very structured in the way they think so you find that many engineers prefer the logical structure and process involved with developing and defining features in Pro/E. After all, Pro/E stands for Pro Engineer. It was designed, developed, and tested by engineers so it's going to have a logical feel to it.
I have found that the more creative half of our industry, the industrial design sector, prefers to use Solidworks for the interface. It basically comes back to preference: bland with a pinch more speed or easy to use but a tiny touch slower.

Stanislav: Solidworks doesn't change its interface from version to version, it just adds features- you're not relearning each revision.
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Where Do You Find Inspiration?

So I'm searching for the tools to start this article on my inspiration with consumer products. You know, I'd really prefer to write the draft out on paper instead of going right to the laptop, even though I usually can't get enough of my new laptop. Man, do I love that laptop... I grab the lined paper as the blank paper makes my sentences all crooked. Also, I really hate when the marker pens bleed through the paper and I get ink all over the back of my hand... I'll grab the ball point.

I'm sure you can see where I'm going with this. While those types of conversations are usually very internalized, we go through many decision making processes with the items we choose to engage with throughout the day. There is a sense of gut instinct associated with these product relationships and for me learning about that instinct inspires my design process. Whatever the project, I find it intriguing to learn more about the user and his or her environment. By jumping into the shoes of the person I am designing for, I look for nuances in their behaviors to design around to improve the experience. These may be physical observations or in many cases something much more psychological in nature. There are sometimes hidden anxieties or delights associated with owning a product that are very interesting to delve into. As an example, why would a user decide to keep returning their new MP3 player to its original packaging for the first few days? Is it worry about damage? Maybe it's just to prolong the feeling of indulging in a new purchase. Perhaps they aren't yet comfortable with their decision to buy the item in the first place. How can I begin to address this creatively?

As a designer, it's hard to stop watching people and the built world around me. It's amazing how much can be observed just on the way to work in the morning. Sometimes the way a door hinges open, or the color and texture combination of light hitting a building is a reminder that there are so many things to explore and interpret. Even the knowledge that everyone sees this world and the things that make it up a little differently is inspiration itself.

Lisa is an industrial designer in the PDT Chicago office. She works closely with both the design and research teams to build a strong bridge between them and deliver thoughtful design solutions.

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Steve: It also leverages the average person's knowledge of Windows and uses a lot of familiar interfaces. For example, the way you save files is the same way you'd save them in Microsoft office.

Bjorn: True… but I do love Pro/E's working directory. Once you grow accustomed to using it, it's a fantastic file management tool.

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Erik has been a PDT team member since July 2006, contributing to projects as varied as toys to military gear, structural packaging, softgoods and consumer electronics. His interest in the importance of design to healthy business growth has lead him to DePaul University where he is studying to earn his MBA, concentrating in entrepreneurship and market research analysis.

When approaching a project for the military and defense industry, I draw inspiration from the user and the specific job characteristics that are to be performed to arrive at a highly functional, user centric solution. It is my feeling that defense related products are viewed by their users as a 'tool' they depend on to assist them in performing their duties, focusing primarily on unencumbered functionality.

Before concept generation begins, my initial reaction is to take a step back and properly frame the project in context. For example, instead of framing the project scope as 'this is product x,' which often results in incremental innovation, I think 'what does the user need this product to do'- 'what functions must it perform?' With this in mind, I first look at the general architecture of the product to see where value can be added for the user through feature improvement and the like, with internal components always in mind. Likewise, I try to challenge preconceived notions that may be held as to what the product 'is', as this helps generate a divergent range of concepts.

Next, I look to all different sources like nature and consumer trends for inspiration on colors, materials, etc. that can be applied to the design. This is very important for this industry because texture and color are necessary to make the end result a solution that offers tactile feedback and intuitive operation for all different types of users.

Inspired solutions for defense products are critical for providing safety and security to their users and those they protect.

Steve: If you're working with any mechanism where you need to see motion, Solidworks is the only option- it handles kinematics beautifully, measuring velocities, motion, acceleration. It has special mates for gears…

Bjorn: You're right. I've taken data from Pro/E and put it into Solidworks so I could see the mechanism in action. If you have two parts moving, Pro/E is fine, but it you have, say, a four part linkage, forget it. The other option is just build a physical prototype.

Stanislav: I would like to touch on the assembly aspects of both programs. I believe, and get almost unanimous agreement, that Solidworks is superior when it comes to mating parts or assemblies.

Steve: Yes! Recently I used an advanced mating feature in Solidworks that allows you to set angular or linear limits. Technically, the model was fully constrained but motion was allowed within the limits defined by the mate. I'm pretty sure this can be done in Pro/E but it may be much more involved.

Stanislav: What's great about having expertise in both softwares is if we get an .iges or .stp file occasionally Solidworks is better at importing it, sometimes not. It's great to have both because you don't necessarily know which will be better. This is especially an issue when it comes to data from laser scans or during a reverse engineering exercise.

Bjorn: Of course, in the end, the determining factor for us on what software to use at PDT is solely based upon what the client needs. Whether they need a Solidworks or Pro/E model, we can do that.

Send questions, comments & rebuttals to askpdt@pdt.com

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About PDT

At PDT we believe the success of a project relies on our team members' insight into today's product development issues, advances, technologies and trends. We actively seek out the information needed to stay savvy to the issues and opportunities facing our clients, continually building a foundation of knowledge and inspiration that helps our team design products which spark desire, devotion and success in the global marketplace. We are happy to share just a few of our team members' insights, observations and opinions with you in this publication. For more information, please visit us at **www.pdt.com** or contact us.

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This Issue's Contributors

Joel Delman is Director of PDT's L.A. Office. With a background in law and business as a foundation for thirteen years in product development, Joel understands the business side of creativity and how to strategically guide innovation and design to meet the demands of today's competitive markets. Joel's prior experience includes a successful startup toy development firm and a stint in corporate law, "which I'm thankful to have left behind before the 'golden handcuffs' got too tight... you have to do what you love in life."

Stanislav Dmitriyev has worked in PDT's Ukraine office for three and a half years. He is proficient in both Pro/Engineer and Solidworks and has experience in the medical, communication and automotive industries. "I love hiking and cars and live by the credo 'take from life everything you can and never slow down!'"

Bjorn Gunderson is a talented mechanical engineer who is self-taught on both Pro/E and Solidworks. Bjorn is a member of the world champion Beach Ultimate Frisbee Team, the Chicago Scandal. A lifelong cyclist, he raced BMX bikes in high school, mountain bikes in college and "currently I dodge traffic riding to work daily." Bjorn has used his Pro/E proficiency on personal projects like furniture design, bike component design and interior decorating.

Steve Jones' passion in product development is seeing what's on the screen come to life. "It's a unique feeling to hold something you created in your hands, watch it work, and know that you engineered it to the best of your ability." Steve has used Solidworks consistently for three years and loves to explore new features of the program in an effort to increase his efficiency and effectiveness as an engineer. Outside of work Steve likes to play volleyball and basketball.

Joel Delman, Stanislav Dmitriyev, Bjorn Gunderson, Steve Jones