



Manufacturing and Technology Matters

University of Wisconsin-Madison School of Business

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Product Development: A key multi-functional business process

The editors of *Manufacturing and Technology Matters* recently sat down with three UW-Madison professors—one from the College of Engineering and two from the School of Business—to get their views on product development.

Professor Mark Finster - Operations Management

MTMatters: What is the aim of product development?

“For more than a thousand years, in one form or the other, product development has been in a continual state of evolution. However, the rate of evolution is rapidly increasing. Today, product development is seen as a strategic system by which individuals and firms create the organization’s future through its products and services”

MTMatters: How important is product development?

“Typically 65-75percent of the cost and quality of a product are determined during the design stage. Thus, it is essential to manage this critical process well. Today, in innovative companies like 3M and Hewlett-Packard, product development strategy focuses on rapidly delivering breakthrough products to capture market share.”

MTMatters: Are there any contemporary trends that are driving the product development process?

“One important trend has been the focus on breakthrough products. Over the last decade, a company like 3M has followed the strategy of increasing the proportion of its product portfolio that is new. Ten years ago, 20 percent of its product portfolio had been developed within the last three years. That proportion has increased to 30 percent, and today 3M has a target of 35 percent. This strategy intends to capture a dominant market-share position through first-mover advantages and reap first-mover profits. This strategy has important implications for the product development process, especially given the demands of the first mover in the market place. One consequence is to move the breakthrough concept away from ‘genius’ to a more systemized innovation process. The trend is to reap the benefits of a diverse development team that utilizes creative processes and technologies.”

MTMatters: What are some noteworthy methodologies used in product development processes?

“There are quite a few methodologies that are on the cutting edge of product development in the world today – such as TRIZ, Design for Six Sigma, Design for Value, Rapid

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SCHOOL OF BUSINESS
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Prototyping, and Sensory & Kansei Engineering, to mention a few.

“TRIZ started with Genrich Altshuller and others from the Soviet Union after World War II. These early inventors sought to systematize the process for innovation by studying the way invention occurs. They screened several hundred thousand patents and studied the invention process of the 40,000 patents that were truly inventive. From this they found, for example, that innovation often occurs by solving or addressing a contradiction, such as completing a task faster and with fewer resources, or such as making a material stronger and with less weight. By examining these patents, these researchers identified 39 fundamental technical characteristics that lead to contra-

dictions. They also discovered that there is a standard set of 40 principles that allows the designer to overcome the different combinations of contradictions. Today, TRIZ researchers have examined more than a million patents and the body of knowledge has grown to include many tools and several systematized approaches and algorithms for breakthrough and for predicting product evolution patterns. TRIZ is currently used by thousands of organizations, including Ford, Chrysler, Allied Signal, Emerson Electric, Johnson and Johnson, and Xerox.

“Design for Six Sigma (DFSS) brought together quite a few different methodologies, such as

rapid prototyping, quality function deployment, design of experiments, and other existing design technologies. These have been integrated with the aim of finding out what it is that creates value in the marketplace and then integrating those value elements into both the product and production processes. DFSS was developed at General Electric in the mid-1990’s as part of its overall Six Sigma program.

Value Analysis refers to the methodology that employs an analysis of customer behavior and uses patterns to identify products and services that create value for customers - in ways often inconceivable by customers. This is one approach to develop breakthrough products.

“Sensory and Kansei Engineering refer to methodologies that involve both the analysis of sensory perception and the psychology of emotions. Since we experience products and services through our senses, this methodology examines a customer’s experience through each of the five senses, and then seeks to create emotions that ‘just feel good.’ For example, a hospital patient typically experiences an MRI machine with high anxiety. This methodology asks the designer to address this need through each of the five senses. The surfaces of an MRI machine close to the patient now exude an almond scent that calms him or her.

“All these methods are quite complementary and the experts in these fields often borrow and improve their own methodologies in the drive to facilitate breakthrough product development processes.”

MTMatters: What tools are commonly used in the product development process?

“Other than the numerous ubiquitous planning tools and spreadsheets, there are design tools such as target costing that allocate the cost of the product across the constituent components according to the value that these components add to the customer. Reliability deployment is another useful tool since reliability relates strongly to dissatisfaction, retention, loyalty and brand value. Traditionally, reliability has been measured by looking at the mean time between failure and those attributes with the shortest mean failure times have been selected for improvement. Today, reliability is driven more by its impact on retention and loyalty. That is why Ford has focused energy on its service function, since Ford believes that service for luxury car owners drives loyalty and retention, and thus profitability, even more than, say, purchase price.

“As mentioned earlier, Kansei, TRIZ and Design for Six Sigma also offer many tools and methods that are used in the product development process. These tools incorporate three important aims in their methodology or in their outputs – to identify and create value for the customer, quicker, and with fewer



Professor Mark P. Finster is a faculty member in the School of Business and the College of Engineering at the UW-Madison, and a contributing member in the Center for Quality and Productivity

Improvement, the Consortium for Global Electronic Commerce, the Center for Quick-Response Manufacturing and the Gaylord Nelson Institute for Environmental Studies. He also serves on the executive boards of the Erdman Center for Manufacturing and Technology Management and the Manufacturing Systems Engineering program. Finster designed, teaches, and directs the School of Business master's and Ph.D. programs in quality management and is active in executive and outreach education. He has received the Gaumnitz Distinguished Faculty Award and the Mabel W. Chipman Excellence in Teaching Award and has helped improve the management systems of more than 150 businesses, government agencies, and nonprofit organizations from four continents.

resources. This contrasts with methodologies that use chains of isolated departments that focus on their own functions or technologies.”

MTMatters: Are there any other changes that have occurred in the product development processes?

“In many companies, market researchers and engineers work closely together. However, there is increasingly a realization that the primary role of the market research group is to serve the sales, advertising, and channel management functions, and that the information obtained for these purposes is not ideally suited for product designers. In my experience, more and more designers are getting out where their customers are to obtain first-hand information about their products and services. A chief designer at P&G might spend a typical day watching people wash their hair in their homes to get to know and experience firsthand the manner in which P&G’s products are used. According to that chief designer, that is the only way P&G can truly capture information and feel the experiences that may be critical to the success of breakthrough products.”

MTMatters: What ethical challenges do designers face when involved with product development?

“I think that the large tidal wave coming toward product development is the issue of sustainability. Most of the material and energy sources that are used currently, such as metals and oil, are not sustainable. There are powerful economic, political and social pressures on industries to become more sustainable so that we don’t consume the future of our children. Governments and markets in many countries have placed constraints around a number of product development processes and this trend is something that is intensifying and is going to spread throughout the world.

“For example, automotive companies are changing the way they design their cars to take advantage of sustainability issues. At the end of a car’s life it often has little value. However, if a car is designed so that its materials can be easily integrated into the next design cycle, it is much cheaper than ripping apart the earth to extract the shrinking supply of ore,

and to turn that ore into useable frames, for instance. One basic principle of this design approach is that everything that is designed should be ‘food’ – or an input of value - for some other process. Then there is no waste and all outputs will have value, even at the end of their intended lifespan. One way to do so is to treat the next design cycle as a customer of the current design cycle.”

MTMatters: Is there a new product or service that is at the top of your wish list?

“The universal language translator. Technology that lies at the heart of translators has made great strides in recent times. Imagine the synergies that are going to become available when we can communicate more effectively across cultures to people in say China or Indonesia or Korea or Iraq. I think that will change the world in unimaginable and wonderful ways.”

MTMatters: What advice do you have for product developers?

“Climb out of your function as much as possible. I think that the Taylorization of the product development process and of the educational process has done more harm than good. I would ask an engineer to learn how to think like a marketer and a marketer to think like an engineer. The creativity that can be spurred by broadening one’s sphere of experiences is usually more impactful than becoming more specialized. There are incredibly bright people within every function and I think that employing their talents in different activities and paradigms in turn enriches their contributions to their original areas of expertise.”

**Professor Robert Lorenz-
Mechanical Engineering**

MTMatters: Where is product development today with respect to use of cutting-edge technology?

“When I started in the industry, we were very much technology-driven in our product development process – we saw opportunities where technology

could revolutionize the existing processes and we also developed new methods and techniques. We were often five or more years ahead of where the market expected us to be. Over the years, I think that aspect of the product development process has changed to a more market-driven process. Technology has not

been able to push the markets as effectively as it did previously.

“A result of the transition to a more market-driven approach is that U.S. companies have become more focused on immediate rather than on future market needs. In a large number of cases, U.S. companies are neither creating the market of the future nor addressing the likely places where the market would be in the future.

Meanwhile, many off-shore-based companies have become increasingly adept at assuming higher risks and anticipating future changes in the

marketplace. The apparent product development strategy followed by U.S. companies seems to focus on the immediate market and an implicit plan to acquire future technologies from international companies. As a result, much of the product development jobs have begun to shift overseas to China, South East Asia, and India.”

MTMatters: What are some other changes that are taking place in the product development arena?

“At the universities, collaboration with international institutions and companies is becoming ubiquitous. For example, I am on the board of advisors for one of our former Ph.D. students who initially worked in product research here in the U.S. and recently has gone back to Shanghai and started his own company. GE, with whom our research group has had a long lasting relationship, is another example of a company that has recently changed its corporate R&D struc-

ture to a global structure with R&D centers in India, China, and other developing countries. Product development is now occurring internationally, and that is increasingly becoming the norm, essentially driven by the actions of multi-national corporations.

“In addition to that, educational coursework is becoming an international product as universities market their advanced courses to the world. Engineers everywhere in the world can now take advantage of the advanced, Ph.D.-level, research-oriented engineering coursework through the UW’s distance learning program. I have also seen industry increasingly bringing together cross-functional, diverse and multi-disciplinary teams. Innovation processes driven by one discipline are often a recipe for failure.”

MTMatters: What kinds of tools and methods and ideas are coming to the forefront in the product development process?

“I won’t talk about the engineering tools and methods that are used in industry because they are simply what engineers create and use in normal day-to-day activities. I would prefer to focus on *market research for research* which is a useful paradigm for engineers as they confront challenges and identify opportunities.

“Classical market research for products is relatively well-developed and engineers have been able to create solutions that address the product needs. In contrast, I don’t think that today’s engineers understand market research for research. What does it mean? The idea is to capture information within an engineering enterprise or process, evaluate the problems that offer significant value, and identify research needed to create solutions for those problems. The industry-funded Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC) that I co-direct has been quite successful in carrying out market research for research for over 22 years. The principal reason for our success is the depth of the sponsor relationships WEMPEC has cultivated with a range of companies. As we visit these sponsor companies and gather information about their technical challenges, we are often able to assess the state of technology and product development and then institute appropriate long-term research directions to address these challenges.



Robert D. Lorenz is the Mead Witter Foundation-Consolidated Papers Professor of Controls Engineering at the UW-Madison. Prof. Lorenz is also the co-director of Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC). He is also a Thrust Leader for Controls and Sensor Integration (CSI) for the Center for Power Electronic Systems (CPES)-an NSF-funded Engineering Research Center. His research focuses on advancing the practical use of modern control and estimation theory in electromechanics and the development of sensorless design methodologies. Professor Lorenz has applied this knowledge to industrial, aerospace, and office automation systems which employ control methodologies and varied estimation techniques.

“But market research for research should not be viewed as falling solely within the purview of engineers or researchers. Management can and should be involved in facilitating such avenues for cooperation. I would like to see the business school incorporate such specific approaches into their product development and management of technology programs that will help prepare graduates face the changing product development scene in the industry today.

“Right here in the UW College of Engineering (COE), we have been training our graduates and research engineers to recognize such opportunities, work within industries as a part of their training, and evaluate the technical challenges that they come across. Moreover, seeds of entrepreneurship are frequently planted during this training process as our graduate students and faculty members brainstorm and evaluate solutions. Feedback about problems and challenges from contacts within industries are instrumental in focusing COE researchers on the opportunities that exist within that industrial setting. In summary, market research for research is an important methodology that can be applied globally within the product development process. The people that excel at market research for research are often those who are on the cutting-edge of technology, who have a good grounding in technical know-how, but are prepared to pursue research opportunities that may be hidden within the product development processes.”

MTMatters: What ethical and other challenges are associated with the product development process?

“I think that the legal profession in the U.S. has been instrumental in creating awareness of the need for safe and reliable products. The other concern is about the manufacturing process that occurs after the product development – U.S. companies on the whole have lagged behind their European counterparts in creating manufacturing processes that reduce externalities. But in recent times, U.S. electronic firms have become sensitized to the harmful substances that are used and produced in their manufacturing processes and they are changing them.

“Another related change agent related to the ethical or moral dimension of the product development process is the government. The U.S. government

and related policymaking has a dramatic role in influencing the strategic direction of the product development process. In some industries, business leaders lobby the government not to set policies that will force the transformation of technology and processes for the longer term. For example, there is legislation passed by Congress concerning the Corporate Average Fuel Economy (CAFE) standards for vehicles in the U.S. Last year, these standards were left unchanged and have remained at a low level for a very long time. There will be little technological innovation if these fuel economy standards are not tightened. Such governmental policies are extremely shortsighted and put the U.S.-based car manufacturers at a significant long-term disadvantage because they will not make the necessary investments in the improvement of technology that their competitors in other parts of the world are making. Corporations are effectively sacrificing long-term survivability for short-term benefits and the government is not taking the lead in setting them on a more sustainable strategic direction. In the end, U.S. corporations are getting out of technology development and this kind of short-term strategy is going to further damage the position of the U.S. in the product development arena.”

MTMatters: Is there a new product or service that is at the top of your wish list?

“E-mail has become a burden rather than a facilitator of communication. If I responded to all of the e-mail (our filters are good and almost all are legitimate) that I get everyday, I would have to spend 24 hours, which is not sustainable. I have no doubt that we work much harder and longer than before because of the onerous volume of e-mail communication. I would like to see some process that solves this problem.”

Professor Aric Rindfleisch - Marketing

MTMatters: How does marketing get involved in the product development process?

“Product development can be said to occur in three general modes, namely by discontinuous product development, through technology and process

improvements, and market breakthroughs. Marketing plays a key role in discontinuous product development and in market breakthroughs. Discontinuous product development refers to an innovation that falls outside any existing market segments when addressed by a successful product that redefines the market space. By nature, this is very rare but cell phones are a very good example of how this type of product development works. Market breakthroughs occur when marketing is able to reveal significant opportunities in the customer space that can be captured by modifying the product to suit customer needs.”

MTMatters: Are there tools commonly employed by marketers to provide inputs to the product development process?



Aric Rindfleisch is a faculty member in the Marketing department in the School of Business at UW-Madison. Rindfleisch joined UW-Madison in 2002 from the University of Arizona,

Tucson where he had been Assistant Professor since 1997. He was a research executive with Millward Brown, Inc. in Naperville, Illinois and worked for J. Walter Thompson in Tokyo, Japan. Rindfleisch has co-authored articles that have appeared in the *Journal of Marketing*, *Marketing Letters*, *Journal of Public Policy & Marketing*, *Journal of Consumer Research* and the *International Journal of Research in Marketing*.

“There are several tools that marketers use in obtaining feedback or raw data about a product or service – primarily through surveys, conjoint analysis that captures trade-offs between several utilities and price, sampling at outlets and malls, and focus groups. And there are tools used to extract latent information and desires of the customer that might be critical to a product’s success. Also, there are simulation-based test marketing tools that allow marketers to forecast sales volumes and market share for new products without alerting

competitors. These simulation tools have been found to be quite reliable and have been used in some cases as replacements for beta testing a product. But if you wanted to know how a deodorant was going to do in the market – you’d probably need a sniff-test right in the malls where the customers are.

“Have you heard of Vividence? It’s a rather new company out there that works with customer experience management. It is doing something really interesting, especially for companies that are on the internet a lot.

(MTMatters found that this company (*vividence.com*) has taken market research activities in a new direction. According to its website, “Vividence helps capture and interpret the behavior, thoughts and attitudes of customers on the Web, yielding business insights that lead to improved customer experience and enhanced profitability for their clients.”)

MTMatters: Are there new forms of product development processes?

“In the face of regulations or common challenges, companies have teamed up with their competitors and/or suppliers toward overcoming immediate hurdles before engaging in market competition. Marketers often play critical roles in creating a common brand for the new product that has been designed under collaborative product development ventures—often called horizontal product development alliances such as those found in the HDTV industry. Vertical product development alliances are created between a company and channel partners – buyers and suppliers that also created cooperation between marketing efforts for the product. There are also mixed alliances that incorporate aspects of the vertical and horizontal alliances as well as agencies such as universities and governments.”

MTMatters: Are there ethical challenges that marketers face when involved in product development?

“Marketers have usually been involved in the interfaces between the company and the customer. There is right now a lot of discussion of the ethics of marketing. For example, McDonald’s has been facing critical examination in the media over the question of obesity related to their burgers, whereas Burger King has largely gone unscathed. Are we going to see some horizontal alliances being formed here as in the case of tobacco companies that banded together when faced with class action lawsuits? Earlier, brands afforded some protection in the marketplace but because of the explosion of information in the internet age, it is simply not possible for corporations to hide behind their brands as consumers get educated about corporate practices. Hopefully, corporate responsibility will involve not only the legal but also the ethical aspects of product development.”

MTMatters: Would you like to see any changes to the way in which product development processes are structured?

“I would like to see the marketing function tightly integrated into the product development process right from the very beginning and project managers that are able to form strong cross-functional teams that involve marketers. Also, cross-functional employment where engineers perform marketing type functions would introduce engineers and developers to the critical nature of marketing. The same applies to marketers who should get involved in aspects of engineering the product and not merely act as the provider of inputs to the process.”

MTMatters: Is there a new product or service that is at the top of your wish list?

“Fuel cells. I would like to see the development and adoption of fuel cells that will address the widespread concern about externalities that result from the usage of automobiles. For example, Chrysler introduced a concept about buying miles instead of buying a car, essentially trying to change the way that cars are viewed by the customer. Marketing has an essential role to play in changing the perceptions of customers in such cases.”

OIM 860 – Developing New Services and Products



As part of the MTM curriculum, students can select a project-based course where the theme is applying a strong customer-focus in the development of new products and services. In this class, taught by Professor Mark

Finster in the Operations and Information Management department, business and engineering students work together on a semester-long project with a local company.

AJ Gutierrez (MTM May '04) is currently enrolled in the class and is working with Graber Products Inc. Graber designs and develops both the Saris brand of vehicle racks and the Cycle Ops brand of bicycle-training products. AJ and his team are concentrating on the development process for a specific new product to ensure that Graber is hitting its targeted market.

One of the first steps in the project is for the team to develop an intimate understanding of

the target customers' needs. They are looking beyond market research and sales data to extract the true feelings and needs of the customer. These insights into the customer can be generated using a progressive abstraction method of continually asking “why-why-why” until a critical moment in a customer's use of the product is identified. This critical moment, as Professor Finster continuously stresses in the class, answers two primary questions: why do they want it and why do they use it. It's the stories that customers tell that lead to the identification of their true needs.

Once these needs are identified, the team will help direct Graber to design a truly new breakthrough product. By having this intimate understanding of the customers upfront, Graber can then focus on deploying the exact quality into the design, development, production, and delivery. These are the same methods that the world's top companies use to develop products cheaper, better, and faster.

Book Review: *The Innovation SuperHighway: Harnessing Intellectual Capital for Collaborative Advantage*

Debra M. Amidon, Butterworth-Heinemann, November 2002



Debra Amidon is the Chairman and CEO of Entovation International, Ltd., a global innovation research and consulting network (www.entovation.com). Amidon specializes in knowledge management, e-learning networks, customer innovation, and enterprise transformation. Her earlier books include "Momentum of

Knowledge Management" and "Global Momentum of Knowledge Strategy."

In the five parts of this book, Amidon introduces a new knowledge-value proposition for firms in terms of "intangible economics and intellectual capital." Institutions will be built on collaboration where "trust-led" leadership is based on openness, knowledge sharing and respect for competence of others reaching beyond just cost, quality, and time. Innovation is no longer creativity or R&D, but it is the enterprise of applying human knowledge. Even though many of the motivations for this book are rooted in sociological benefit, the ideas and themes can be specifically applied to improve any product/technology development processes in the knowledge-based economy.

The discussion in Part I is centered on innovation philosophy in the knowledge-based environment. Amidon advocates that knowledge is the primary driver of innovation, not technology. With increasing levels of customer sophistication, innovation is geared toward customer-pull rather than technology-push. Innovation is based on system dynamics rather than a cause and effect value chain that it is linked to research and development outputs. She uses the term "ecological management" to contrast the traditional,

industrial view of financial capital to the view of knowledge and innovation as human capital. The role of management is to create an environment where people take risks – this is where innovation occurs.

Within today's firms, the boundaries between functions have faded and the interdependence is more obvious. Parts II and III provide insights for designing a management process to capture value at the intersections, overlaps and connections within and outside the firm. A portion of this process is to make the innovation process explicit, and much of it is to measure intellectual value or intellectual capital. The intellectual value is multiplied in the "Innovation Superhighway" with collaboration across company and country boundaries. As Amidon suggests, much of these responsibilities could reside with a Chief Knowledge Officer (CKO).

Innovation leadership in practice is covered in Part IV with Amidon's discussion of the 7 Cs of Modern Knowledge Leadership. She suggests that a leader must consider the Context, Competence, Culture, Communities, Common Language, Communications, and Coaching of the innovation process. This is a move away from the linear, competitive, market share-oriented management models of the not-so-distant past.

In Part V, Amidon discusses a blueprint for 21st century innovation that builds up a collaborative national infrastructure similar to the Keiretsu in Japan around 1980 that helped to leapfrog the capabilities of U.S. companies. The book concludes with a reminder that innovation management focuses on collaborative expertise and not just on competitive edge.

Focus

on a

Board Member



*Jim Timmins
President
Breakthrough Development Company
Madison, WI*

Jim Timmins is currently the president of Breakthrough Development Company in Madison. After receiving a B.S. from the University of Wisconsin–Eau Claire, he went on to complete an M.S. in the Management of Technology at MIT. He has held several CEO and business development positions at such companies as Crystal Medical Products, Amplicon, Agracetus, and Amoco.

MTMatters: Tell us about your Breakthrough Development Company.

“Breakthrough Development serves a niche in technology management - right after a ‘breakthrough’ has occurred. It is a critically important time. Inadvertent disclosure of the breakthrough can prevent patent protection in most of the world, and with it a sustained monopoly position. Thus, protecting the intellectual property is of great importance. But at the same time, the usual ‘20 Questions’ asked in a business plan must be answered. The technical team is usually not prepared for, or even interested in, learning how to determine whether a product or business exists for the breakthrough. My firm steps in and establishes as many of these facts and assets—IP, business plan, the value proposition, regulatory path, and partner/investor candidates—as quickly as possible. While my career has been in biotech, the same need exists across many technology areas.”

MTMatters: How does the product development lifecycle differ for a biotech firm, as opposed to other technology-based firms?

“It depends on the product’s reliance on patent protection and regulatory approval. Few biotechs go forward without one, or both, in hand. The first distinction is patents, as mentioned above. Regulatory approval is also well known to be a major challenge for timely development of biotech products, especially therapies and diagnostics. So, generally, biotech

product lifecycles are much longer, affording greater time for strategic analysis and development. Conversely, this pressures companies to capture, and then hoard, investor dollars to ride out the long cycle times.”

MTMatters: Is the biotech industry, as we know it, dead or dying?

“Mostly the answer is no. If one looks at 400 biotech drugs in the FDA pipeline, and low pharmaceutical company productivity, biotech is the only major solution available for future product development. Investors and drug companies alike realize that the greatest productivity for new drugs and diagnostics come from small research companies. The challenging part of the industry is in the all-powerful nature of the FDA, and the hurdles it places in front of new products. If the path at FDA were made clearer and less costly, you would see even more biotech firms—and investors.”

MTMatters: What types of challenges do you see technology managers facing in the future?

“As with most fields, the blessing and curse for technology management is in information management. In the past, a breakthrough was truly unique. With the ease of information flow over the internet, more people are getting to the breakthrough at the same time. Thus, research and engineering teams who hire MTM graduates that are quicker at preparing patents, analyzing markets, developing prototype products, and attracting investors or upper management support will be the winners. But it will take a multifunctional approach from the very start. I am confident that the MTM program is preparing its graduates for this challenge, and I have personally seen these skills applied to Breakthrough’s product development needs over the past year, thanks to **MTM students Weiqi Sa and Jamie Lang.**”

Student Internship



Jamie Lang (MTM, May '03) worked as a consultant over the summer at the Breakthrough Development Company in Madison. The primary goal of the internship was to assist Erdman Center board member Jim Timmins with market research and business plan formulation for start-up life sciences companies. The summer began with Jamie performing heavy market research for segments of the biotech and pharmaceutical industries. In addition to combing over secondary data, primary consumer market surveys were also performed locally and nationally. All data were analyzed and used to determine target markets and corporate partnerships for drug therapies.

Business plan re-writing and polishing became the theme for the second half of the summer. Business plans were analyzed for content and additional market research was conducted where applicable. Cost analyses were performed in order to generate accurate financial projections. All of this information was organized into a streamlined, easy-to-read format for investors and partners alike.

Jamie enjoyed the exposure to small technology based start-ups and the ability to apply business school learnings to real life settings. Developing and gathering market research, making financial projections, and organizing business plans proved challenging and was an extremely valuable experience.

The Burrill Technology Business Plan Competition

The G. Steven Burrill Technology Business Plan Competition is an opportunity for cross-functional teams of UW-Madison students to compete for cash prizes totalling \$22,000 by developing and presenting technology-based business plans to a panel of judges. The competition promotes entrepreneurial activities and serves as a valuable learning experience for students and faculty alike.

Originally called the UW TEC Prize, the Burrill Competition began in 1998. Nearly 200 students have participated to date. Winning ideas have included plans to market and sell products such as personal finance software, bindings for wake boards, and bio-genetic information. Several teams have leveraged the knowledge, experience, and exposure gained from the competition to form successful new business ventures.

Steven Burrill is CEO of Burrill & Company in San Francisco, California. An early pioneer, Burrill is one of the original architects of the biotechnology industry and one of its most avid and sustained promoters. He authors the seminal annual report on the biotechnology industry – considered by many to be the "bible" of the industry. He is a frequent writer and speaker worldwide, explaining, promoting, and helping to guide the biotech industry.

This year, three second-year MTM students took part. **Vivek Dubey**, and his partner Brad Larson, won second prize and \$7,000 for their system to produce DNA and protein microarrays. **Jamie Lang** and **Michael Wirth** did not win a prize, but gave a fine presentation on their Precision Golf Ball system that uses wireless technology to track golf balls, show course features, and keep scores on small monitors.

The G. Steven Burrill competition is supported by the University of Wisconsin Technology Enterprise Cooperative, the School of Business, the College of Engineering, and the College of Agricultural and Life Sciences. For more information, visit www.bus.wisc.edu/burrill.

"The Burrill competition is one of the most exciting activities I see in the University. Students tackle many of the tough hands-on challenges in product development. They agonize over what product features are really desired rather than are cool to inventors. They struggle with trade-offs between product features in terms of cost and value. They deal with the different world views within their teams spurred by a science versus commercial focus. And then they complete the toughest task of all—making up their minds on the final product and how it can create value!"

- Professor Anne Miner, Director (and Erdman Center Advisory Board member)

MTM Alumni - Where Are They Now?



Vikram Gore, MTM 2000

*Senior Consultant
Celerant*

Vikram Gore graduated from the MTM program in May 2000. While in the program, he gained experience through an internship with Rayovac, where he increased the throughput of production lines. He had also gained valuable implementation experience from being a project engineer for TATA Honeywell in India.

Upon graduation, Vikram went to work for Cambridge Management Consulting (CMC), the management-consulting arm of Cambridge Technology Partners. Vikram joined CMC as a senior consultant which meant a short time after joining he was leading a small “work team” of his own helping the client meet its business goals.

“I started my work with CMC with a team assessing the operations of an oil and gas firm. My specific objective in the assessment phase was to look for opportunities in reducing cycle time for drilling oil wells, right from “spud” (when you put a stake in the ground saying this is where you will drill) to “production” (when the drilling is complete and the oil well is tied to the pipelines). The objective of reducing the drilling cycle time is to start production and sell as much as you can as early as you can, thereby accelerating revenues.”

Vikram feels his biggest job so far was implementing a big change initiative for a multinational chemicals company. The firm was facing classic industry downturn issues. The traditional high-margin products were relegated to being commodity products resulting in significant margin erosion. It was a multi-division, multi-site undertaking and an integrated delivery of the change program was of the utmost importance.

“Typically we assess the client’s opportunities in different areas such as production efficiencies, asset optimization, supply chain management, engineering/capital projects, delivery and organization effec-

tiveness, etc. During this time, I decided to be a part of the Organization Effectiveness (OE) service line of our firm. Doing so gave me an opportunity to look at client organizations as a whole as opposed to looking at just production or the supply chain,” said Vikram.

Being a large project, with several stakeholders, Vikram found managing the project meant understanding which of the three key areas of change - rational, political, and emotional aspects - the issues were arising from. Since then, Vikram has continued to work as an Organization Effectiveness Practitioner for Celerant’s projects. Most of the engagements have been in the chemicals sector. “Being an OE Practitioner involves understanding how a company organizes itself. We try to answer several questions in the assessment phase such as: Is there a clear understanding of the company’s mission and vision? Does the organization architecture reflect the strategic intent from the mission and vision? How many layers does the organization have? And are all the groups in the organization aligned to meet the common goal?”

The experience of working with different clients from different industries has been extremely challenging and rewarding for Vikram. Being a consultant also means being a traveler. Since Vikram likes to travel a lot, the “Fly out Monday and fly back Friday” doesn’t bother him at all. For the two and half years that he has been with Celerant, work has taken him to Berkeley; Boston; New Orleans; San Diego; Houston; Green River, Wyoming; Salt Lake City; London; Miami; San Juan; and Qatar. Vikram feels the experiences of working with the different people and cultures in all these locations are priceless.

Reflecting on his experience at UW-Madison, Vikram has the following to say: “The MTM program equipped me with enough ammunition to make the jump into consulting and I was eager to apply all the tools and knowledge I had learned from the business school and various internships.”

The Erdman Center for Manufacturing and Technology Management is the “Home of the MTM Program”

Manufacturing and Technology Management (MTM) is a cross-functional area of study concerned with strategic, operational, financial, and people-oriented issues related to the development, sourcing, production, and delivery of manufactured goods in a global environment. This MBA program leverages the students' backgrounds in engineering or science in generating new skills in product/technology development, business and manufacturing process improvement, IS implementation, and the strategic use of technology.

The graduates' career goals include leadership positions in operations and supply chain, product and technology management, business development, and consulting. Past graduates have assumed positions with Harley-Davidson, TRW, Accenture, Intel, Eaton Corporation, Rayovac, Deloitte Consulting, Johnson Controls, Celerant, Ford, DaimlerChrysler, Novartis, Deere & Co, i2 Technologies, Philips, Abbott Laboratories, Delphi, Samsung, and others.

The MTM program is administered by the Erdman Center and guided by an Academic Advisory Board comprising faculty from the School of Business and the College of Engineering. Linked to the program is also an Industrial Advisory Board with members drawn from 20+ organizations.

For more information on the MTM program at the University of Wisconsin-Madison School of Business, please go to www.wisc.edu/erdman.

The MTM Newsletter



The Newsletter is produced by the graduate students in the Manufacturing and Technology Management Program under supervision of Center Director Urban Wemmerlöv. The objective is to inform professionals, faculty, and students of the Erdman Center activities and events in the field of manufacturing and technology management.

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