Cardiac pacemaker business essay sample

Business, Company

Cardiac Pacemaker Business

The legacy af Medtramc Corporation, the company that created the cardiac pacemaker industry, is a proud one. Starting fram its earliest pacemakers, which had to be carried outside the body, Medtramc had achieved dramatic improve ments ln the functionality, size and reliabilit)’ Df these d evi ces. ln 50 doing it had extended the lives, and improved the quality Df lHe, for hundreds Df thousands of p eople in whom pacemakers had been implanted. The pacemaker has been designated as one of the ten most outstanding engineering achievements in the world over the past 50 years, along with the digital compu ter and the Apollo 11 moon landing. 1 Medtromc, which in 1995 booked operating profit of $300 million on revenues of $1. 7 billion, had been founded in 1957 in Minneapolis, Minnesota by Earl Bakken, a researcher and inventor who had to his credit patents on several af the crucial techn ologies that led to the modern heart pacemaker.

Pacemakers were small, battery-powered devices wruch, when implanted within a patient, helped a malfunctioning heart to beat in a steady, fixed rhythm. Because Medtronk was the first entrant into the p acemaker field and built a strong technological lead, it enjoyed a substantial portion (over 70%) of the market sharp for cardiac [‘”, cing through the 19605. Building upon Medtronic’s legacy Df leadership was not easy, however. ln the face of increasing competition, rapid technological change and tightening market and regulatory demands for product quality, Medtromc saw its market share cut by more than half between 1970 and 1986. Though it had invested heavily in technology and product developrnent over this period, much of that investment had been unproductive.

Many projects faiJed to produ ce product designs that could be launched competitively, and the features and functionality of most of the products the company was able to launch, lagged the competition. Several key employees left the company, seeing greater opportunity to develop their new pacemaker product ideas in new start-ups rather than within Medtronic. These competitors proved much faster than MedITonic at developing new products that advanced the state-of-the-arl in pacemaking. Medtronic was also pummeled by hvo major product recalls related to product quaJity problems. Observers felt the company would have los t even more of the market during this period, were it not for its strong worldwide salesforce and the lingenng legacy of its brand reputation amongst surgeons, the prirnary customer group.

1 This ci ta tion was made by the Nationnl Society of Professional Engineers in 1984. Professor qayto1l~. Chr; stt: 1lSCI1/? r: parct! t” i~ ca~c. as Nu.’ bnsis for cJns~ disCllssioll rn/~la tI./a1l to il/l/slratc cilher ctfectivr or mcffecl/vr flnlldfll1g of (/11 adll1l11/straht’e Sltuaf/Ofl. Some of U, C dala and namcs til tfus case (UIVC Pl’CI/ disguised 1(1 prateei lhe propriclan) ill tr: rcsts of til” COlllpfl1ly.

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We’ve Got Rhythm! Medtronic Corporation’s Cardiac Pacemaker Busines$

Management changes which were initiated in the late 19805, however, had sparked a dramatic reversal in the company’s fortunes, and by 1996 the company had regained its position of product and market leaclership. Sy aII accounts, it was in front and pulling away fram its competitors. On a pleasant Minneapolis spring aftemoon in 1996, several members of the team that managed tlús tum-around — Steve MaNe, president of the Brady Pacing Business; Mike Stevens, general manager of the Pulse Generator & Programming Systems (PGPS) Division; Bill Murray, general manager of the MicroRel component manufacturing subsidiary; Director of Marketing Paula Skjefte (pronounced Sheftee); and Director of Product Development Technology Don Deyo -ga thered to assess the progress they had ma de since they had taken the helm of the troubled division in the late 19805. They were a150 anxious to understand whether the management strucrure and the processes, values, and resources they had created to achieve this tum-around, were ca pable Df maintaining the company’s successful momentum in the future. This case recounts their achievements and concems.

Medtronic’ s Brady Pacing Business

Medtronic’s Brady Business Unit designed and built pacemakers that

delivered a rhythm of electrical impulses, to remedy a disorder called Brad ycardia, in which the heart’s electrical system does not generate pulses to cause the heart to beat rapidly enough to sustam the body’s normal activíty, as described in Appendix L 2 Amongst its other businesses, M edtronic also had a Tachycardia Business Unit, whose products addressed the opposite malfunction – when the heart’s electrical system generated too many beats. Because of the prevalence of Bradycardia rela ti ve to other disorders in cardiac patients, the Brady Business Unit historically had deli vered most Df Medtronic’s revenues, and an even larger share Df its profits. Consequently, the health and vitality Df the Brady Business strongly affected the corporation ‘ 5 overall financial performance.

The Brady Business Un. j. t worked hand·in-glove with the component divisions of Medtronic The Promeon Division, for example, developed new technologies to power pacemakers. ln the early years Df the industry’s history in particular, battery technology had been a pivotal selling point because the battery could not be replaced: once it w as depleted, a new pacemaker had to be implanted. Another division, MicroRel, designed and fabricated the criticaI hybrid microelectronic drcuits in Medtronic’s p of Medtronic, PGPS focused on developing new products for Bradycardia pacíng, by translating customer and market-based inputs into product designs, and then worked closely with manufacturing to produce the final products.

This involved design and assembly af the pacemaker as well as the progranuning unit, which typically sat on a table in the cath lab ar aperating

roam where the implantation was performed. Programming units allaw ed physicians to tailor the firmware in the pacemaker 50 that the frequency of the pulses it generated and a number of other attributes of the deviCe matched the need s af each individual p was to try and get decisions to be made by lhe functionalleadership — the)’ onl)’ had minor authority to make decisions themselves. “ Planning new products is actuall)’ a lot more difficult in a busi. ness like trus than it looks,” reflected another experienced executive. “ ln sonie businesses the problem is a laek of great ideas.

But in our situa tion — with rapidly changing technologieal possibilities, some darned good compentors and thousands of cardiologists out there with ideas for all kinds of ne’ ieatures, the opposite is true: We’ve always had too many ideas for new products. ln our functional organization, without a single, eoordína ted process or person to articulate a product plan or strategy, development projects just started everyvvhere. When you had a good idea, you’d mock up something – either a real prototype or something on paper — and carry it around with you. Then when you’d run into Earl Bakken or another powerful manager in the hall, you’d com er him, pull your idea out of your pocket, and try to get him to support it. If his reaenon seemed positive, then you would use that leverage, to get a few friends to help you push it aI ong. At some point you’d go to the engineering manager to get formal resources.

“ The problem with this system was 110t that we were working on bad ideas. Most Df them were teehnieally sound and made market sense,” commented Don Deyo, êlIl experienced engineer and currently Director of Product

Development and Technology. “ We were tr)’ing to do too many th.. ings, and no project got the foeus and attennon needed to get it done right It was taking too long to get anything to market. We never got good at releasing new products, because you only get good at things you do a lot. Those that we did introduce oHen fol1owed the lead of competitors. That’s what happens when you continually try to respond to every new idea to come along.”

The problem then fed on itseU,” reflected Mike Stevens, general manager. “ The developrnent people would tell me that they could never get anything to market because marketing kept changing the product description in the middle Df the projects. And the marketing people would soy that it took so long for engineering to get anything dane, that by the time they got around to completing sornething, the market demands would have changed. When customer requirements evolve faster than you can develop products, it becomes a vicious spi ral. ” ln environrnents like that, it is ver:; difficult to plan product families.” Stevens continued. “ lf the company launched a product that subsequently could be modified or extended to create

denvative models, it was a stroke of luck .” Because of the nd /7oc way in which new product development projects were conceived, Medtronic’s project pipeline was made up of incongruous development cyeles. Projects were separated according to whether they were single or dual-chamber platforms. Each new model had largel y its own unique circuitry, components, testing programs, casing, and battery . Due to the high costs of developing all these parts of the pacemaker, project managers battJed each

other for resources. A1though the company’s reputanon and stTong salesforce relationships with surgeons kept disaster at bay, the eompany’s performance suffered as a result Df its disabilities in development. Betvveen 1970 and 1986, it was almost always ~ eompetitor, not Medtromc, that introd uced major new improvements to the market. For example, Cordis introduced the world’s first programmable 3 paeemaker in 1972; Medtramc followed in 1980.

Cardiac Paeemakers Ine., a Medtromc spin-off, pioneered the first paeemaker with a long-life lithium battery in 1974. Even though the technology was available from a third-party supplier, Medtromc did not get its lithium battery-powered product out the door until 1978. Although Medtramc introduced its fust dual-chamber pacemaker during this period, it did not follow it with an improved dual chamber device for another eight years. Deyo explained, “ We were wo rking on next-generation dual chamber products during all of those eight years. The problem was that just as we’d get ready to announce a new product, a competitor would come out with samething better. 50 we’d force the funnel open again to allow for tlUs new input, re-scope the project, and try to leap ahead of the competitor. Then just as we’d get ready with the impro’ed version, a competitor would come fi ahead of us with an even better product; and 50 on.”

“ I got 50 that I just didn’t want to answer the phone because I was afraid there v·: ould be a salesman on the line wan ting to know when we were going to come ou t wi th a prod uet tha t was comparable to something a competitor had introduced,” recalled Paula Skjefte, director of marketing. “ 1

jU5t couldn’t g1ve him an answer.” Field product failures compaunded the problems caused by Medtromc’s long de’elopment eyele. Its Xytron paeemaker line was recalled in 1976 after several units fai led following implantation. And a few years later, physicians found that the leads on some pacemakers they had implanted had disintegrated, 50 that the pacemaker’s output was not getting tTansmitted to their patients’ hearts. ln total, Medtronic was forced to issue four different produet advisories to WaI11 that certain models were suseeptible to malfunetion.

The result of these factors was a mass i’e 1055 of share, from 70% in 1970 to 29% in 1986, as shown in Exhibit 2. Sti ll, however, due to significant growth ln the market, the company continued to report record sales and profits over this p erioa, and “ for many in the company there was no cause for alarmo “ Medtronic was a really nice Minneapolis company,” Don Deyo noted. This re flected in many ways the val ues of Medtronk’s founder, who had a genuine reverence for every employee’s contributions to the company’s 5uceess. “ But somehow in the mid·1970s, Deyo noted, “ This attitude got out of hand. We dominated the market, and were very profitable. Because there was 50 little pressure on the business, we lost our intensity and willingness to foeus our dforts.”

A Home Run Saves the Day

The company’s decline was arrested in 1986 — more by good fortune than any change in management practice, however. ln the early : 1980s a projeet leader, Ken Anderson, championed an idea for a “ rate·re5ponsive” pacemaker·- a device whieh eould sense when changes in bod y aeti v ity

required the heart to beat faster or slower, and stimulated the heart to beat accordingly. A lthough most cardiologists Anderson spoke to thought the idea was impractical, and despi te the indifferenee of most of Medtronic’s stafL Anderson won the support of the general manager, and the two of th em seI up a dedicated team lo pursue the idea. lts product, dubbed Activitmx, worked — technologieally and in lhe marketplace.

Cardiologists found its single-thamber design easy to implant, and its effect was nearJy as good for patients as a dual chamber pacemaker. Patients reported feeling stronger, because it would cause their hearts to beat more rapid ly when they were working hard or exercising. And they reported feeling more rested in the moming, because -Activitrnx paced their hea rts to beat more slowly when they were asleep. The dramatic Activitrnx therapeutie breakthrough literally s.! lved Medtronic, because no other new platform products were read y for introduction unti11992. lt did nol, however, “ Iter the way the company developed products.

The Turnaround in Product Development

Though Medtronic’s marke t position was helped by the success of Activitrax and bv a seri ous product recall suffered b y a principal competitor, the m os t dramatic changes in the ~ompan y’s market position were instigated when Mike Stevens -was assigned to be vice president for product development of the PGPS Division in 1987. Stevens’ career with Medtromc had begun in 1973, when Motorola decided to shut down its hybrid circuit manufacturing operation near Phoenix. Stevens and several other employees of the Motorola facili ty decided to continue the opera tio n and obtained financing

from Medtranic, w hich h ad been a major customer. Stevens had wa tched Medtronic’s struggles in product development from a s uppli er’s ’ iewpoint.

“ Though I didn ‘ t have a background in product development, I sa w much Df Medtronic’s problem as Management 101. We had very strong functional roles. People were being measured by cost centers, and th ere was no accountability for the delay or failure of a new product. I felt the bas ic va lues and etrucs of the company were still reall y strong. But wha t needed work we re its processes. I feH if we cou ld get those strai ghtened Qut, then we could b ring the Brady business back to its past glory.” Stevens sununarized key elements of his management philosophy as follows:

Commitments are sacred. The more responsibility you gi ve to people to control their destiny, the more you can and must hold th em accountable.

C reate a sense of urgenc)’ b)’ contrasting the excitement of bringing new therapy to pa tients, versus the consequences ii yo ur competitors are there fi rst w ith better solutions. Don’t waste time wíth excess trav eI ar off-site meetings

ATe happy employees p roductive, a r are productive employees happy? Stevens believed the latter, whereas Medtronic management had been acting as ii the former were true.

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Do nothing tha t separa tes management and employees. Ma nagem ent means responsibility, not status.

You only get w hat you meaSure.

Focus on gaining marke t share. Over time, this is the m ost accurate measure of you r succesS.

Managers in the PGPS Division got ataste o f Stevens' belief tha t commitments are sacred w hen, shortly after arriving at Medtromc, he held managemen t to the project milestones they had agreed u pon a t the beginning of fiscal year 1988. Their incentive compensation WilS tied to these objectives, and 1988 was the fust year in memory that management did no t receive year-end bo nuses that were tied to objectives.

Measuring Product Development Performance

Stevens implemented rus measu rement philosophy by focusing on faur mensu res of product development performance, which co rresponded to the achievem ents he w anted the organiza tion to foeus upon. These are described in the following table.

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Focus

Measure

Speed

Cyele time

Stevens’ Comments

“ nus is the time required to get a neVl! product mto the market. Ii I measure this, there isn’t rnuch else I need to measure. It forces you to do the other things ri~ht in product development, becausl” you can’t make mistakes, and you can’t waste time.”

Fully allocated unit product costs

“ The reason we foeus on fully aUocated cos1. rather than just viewing functional çosts ar direct product costs, is that it gets vou thinking about market share, and the ímpact that unit ” olumes cao have 00 your financial suceess. This is healthy thinking.”

lnnovativeness

Product perfonnance relative to eompetitors

“ This translates into market share, pure and simple.”

Product Quality

Field performanee defects per million

“ ln our business, vou can’t afford a field failure — beeause our patients COilllt on Ús, and doctors can choose to go elsewhere.”

Most people in PGPS welcomed Stevens’ attitude. One commented, “ I was just getting started as a project manager, and Míke was a breath of fresh air. His priorities were elear; I ! mew where he stood. He had a very different

management style: ver)’ firrn, asserhve, thoughtful and focused. He was exeeution-oriented, and really held people aceountable.

Processes and Practices

“ nus isn’t a 5tOry about great management,” Stevens emphasized. “ It’s a story about putting into plaee a set of processes that helped a great team of people be as produetive as they could be.” The processes Stevens instituted had the following features:

1. Spced “ Being fast to market eliminates 50 many other problems,” commented Steve Mahle, who took over as president of the Brady Pacing Business in 1990. “ The slowest part of our process was actually in deciding what needed to be done. We used to spend lots of time debating what we should do. One of Mike’s greatest achievements was in cleaning up the front end. He did this by artieulating very elearly what our strategy was, 50 that there was a weU-defined cri teria that could guide these deeisions. Then he created a proeess to get those decísions made.” Exhibit 3 deserihes the proeess by which new produets were defined.

An asse5sment Df the eompetitive and customer envirorunent was combined with a technoJogy assessment, to define the business objectives of each new product, and to cladf)’ what the financial and competi tive contributions of the new product needed to be. Stevens, who by 199] had become division general manager, reviewed new product ideas according to their potential for meeting those business objectives. His staft, comprised of the managers of the division’s marketing, re5earch, development, technology, finance,

human resourees and manufacturing functions, participated Ln this review with Stevens.

2. Platfonn Strateglj Since product ideas in the earlier regime had originated in disparate parts of the organizanon and were approved and funded in independent decisions, it was quite COrnInon that products that required signifieant investments of time and money were not leveraged with deriva tive products that could extend their life and market reach. The highJy suceessful Activitrax model, for example, did not spawn a single deriva tive product that offered different features, performance, or price points to the market. To devise an effeetive product tine archítecture built around product platforms, Mahle established a produet planning team comprised of himself, Mike Stevens, Paula Skjefte, Don Deya and Stan Myrum, Vice president and general manager af the business unit’s leads division. This team defined a platform strategy around three key elements.

The first element was that the initial platform product had to be designed to accommodate the full range of derívative models from it, without significant redesign. “ ln other words,” Stevens explained, “ We designed the highest-performance, most fully featured version of the product at the outset.” Medtronic then created derivatives by de-featuring and de-rating certain elements of that design, so that it could address other tiers of the market as well. The second element of the p latform strategy was enabled by the first. Historically, Medlromc had introduced new pacemaker features on its single-chamber models first, because they were technologically simpler to design and build. Once the features were accepted and the technology perfected in

the single-chamber platiorm, the features were then moved up-market onto the dual chamber platform. “ The effect of this,” Paula Skjefte noted, “ Was to force a lot of our lead physicians to continue focusing Dn 5ingle-chamber devices just 50 they could utilize our newest fearures.

Once we began designing the platform to accommodate the full range of deriva tive models we planned to spin off from it, we didn’t face the sarne constraint – it was just as easy to put the most advanced features on the dual chamber modelo This gave us a much clearer progression from basic, sim ple devices for the low-end of the market to high-performance, fully featured models at the high end. Skjefte continued, “ The way we used to play in the low-end of the market was to discount the price of aur old model, after we had introduced a new one. This was ironic. Because we Vere reducing the cost Df our products with each generation, we sold our high-cost models at the lowest prices, and aur low-cost, newest models at the highest prices.” The result was that there was little incentive to maintain a stTong presence in lower tiers Df the ma rket.

Under the new strategy, Medtronic addressed lower price points in its market with the simplest versions af its new lower-cost pl, üforms. Hence, even as Medtroruc was assuming a leadership role in feahues and functionality in higher tiers af the market, it strengthened its position in the low end as vell. The third aspect of Medtronic’s platform strategy was to change the way platforms were defined. Formerly, Medtronic had though t of platforms in terms Df physical an: hitecture. Hence, it was inconceivable that a dual-chamber device could have been levered off Df a single-chamber device

platform. The projects were executed by completely different teams, and their designs therefore diverged from the very beginning. Under the new stTategy, advances in microelectronics technology enabled 50 many of the most important capabilities to be designed into the hybrid circuit, that the circuit design constHuted the platform.

This circuit could then be modified quite readily, often through firmware modifications, to enable Dr disable particular features in the design of deriva tive products. “ 1 couldn’t say whether Medtronic’s decision to integra te backward into hybrid circuit production by starting MicroReI was good luck or good management,” Stevens reflected. “ But at this point the expertise we have developed in circuit design and production is an enormous advantage. Our competitors outsource their hybrid circuits. But we have found that the hybrid is 50 integral to our fW1ctionality and Qur standards in quality and specifications, that suppliers just can’t meet what we need. We can outsource things that are a little bit more modular — things “ hat aren’t 50 integral to the eS5ence Df our product. And being vertically integrated helps with speed. We can go down to rvticroRel and shift priorities ii something needs to be done quickly. We are a150 vertically integrated with our battery developrnent and manufacturing.”

Medtronic faced MO particular challenges in implementing its platform strategy, Stevens reflected. “ First, we leamed that we needed to have the technology building blocks in place, befor. we could begin a platform project. Product development is not technology development — you can’t have the uncertainties of advanced technology development on the criticai path of a

rhythmical1y executed product development project. Technology takes time to put into place, and it requires consistency in strategy and management methods, to tie advanced technology development with product development in a consistent, u5eful way. The second challenge we encountered was that platform projects required 11l1lch more interaction and coordination amongst various individuals and groups in the company – within engineering, and across engineering, manufacturing, marketing and finance — than other proJ'ects. You can't have a ' one-size-fits-all' habit Df or CT developrnent teams, if yau're really serious about a platform strategy."

Indeed, Stevens' deeision to vest platform development teams with mueh greater deeision making authority — essentially making project managers the peers Df functional managers — had a pervasive and some times disruptive impact an many in the organization. Hea" yv. reight project managers with dedícated tearns — from research, developrnent and marketing — o'ersaw the development of every platform. Other project managers, working under the supervision Df the platform manager, took responsibility for derivative projeets extending aff of eaeh platform.
This represented a significant shift in the job Df the company's functional managers. Their charge became providing trained, eapable people to staH projeets, and developing new teehnology platforms. " It became very clear, very quickly," observed Bill Murray, an electrical engineer-turned-project manager, " Tha t project managernent was the path for career advancement. Even some Df the functional managers left their positions to become project managers."

3. Project Documentation Previous agreements to initiate a project were often made verbally. “ It was amazing how many misunderstandings and disagreements seemed to survi ve those verbal contracts,” Don Deya recalled. “ You could leave a meeting thinking you had agreed on something, and leam a few months later that you hadn’t. Then when we had to change 50mething, the marketing and engineering people were always accusing each other of violating an earlier agreement. ! t’s amazing in a set-up like that, how easy it is legitimately and honestly to find someone else at fault.” One way Stevens implemented rus credo that comrn.. itments are sacred was to require hvo documents to be written at the start of the development phase of each project: A Prodllct Description document, written by marketing, which detailed the customer requirements, product definition and clinical performance expectations af the product; and the Prodllct Spccifícntion document, written by engineering.

This detailed the technical and cost specifications that the product would have to meet, in arder to meet the Product Description. Stevens required marketing to sign off on the Product Speciiication, certifying that there was a technical specification corresponding to each requirement in the Product Description. Similarly, Engineering had to sign off on the Product Description, as a double-check that marketing and engineering were synchronized.

4. Pltase Definition Stevens and Mahle defined a system Df phases and project reviews, to which ali projects would be subject. Projects started in a 17llsillCSS analysis phasc, in which the Product Description was written and the financial benefits of the project to Medtronic were estimated. Following

review of the business case, the project would enter the dCIIlOl1stmtiol1 plza:. c. Here, the technological feasibility Df the project was probed, to a v oid putting the necessity of inventing something on the critical path of a development programo Rapid prototyping was emphasized in this phase, to identify problems and possible solutions as quickly as possible. lf a product idea required a technology that was not well developed, Medtronic would shelve the idea, preferring to wait until the approach had been developed and proven in other markets. The Product Specification was prepared during th. is phase, and consistency with the Product Description was verified.

The major executive review carne after the' demonstration phase, where the proposed product's teclmological potential, competi tive activity and market needs, and its volume, profit and retum on investment projections were rigorously reviewed. " I call this our COnlmitmcllt Rcvicw," noted Mahle. " I believe that language eonveys intent. We had been plagued by waffling and compromise, and weren't doing what we said we would do." At one commitment review on a critical product, in fact, MaNe asked the team to stand up and make a verbal pledge to deliver to the customers and patients what they had said they would. " I believe in the power of personal commitment. Management tools are important, but tools alone won't do it." Following the conunitment review, projects went into the dcvclopmcnf, 01′ COlrlmitlllcllt phnsc of the processo " ln the first tvvo phases we have a lot of product ideas falling out or getting canceled, because we decide the market or technology just isn't there," Stevens conunented. " But once projects enter the comrnihnent phase, we expect

100% Df them to be technically and commercially successful. There is no narrowing Df the funnel after that.”

The Product Planrung Team, whieh as noted above was responsible for establishing the product line architeeture, also had responsibility for eondueting the major phase rev iews for eaeh < project. 5. R/Jythm “ There’s a lot of uneertainty in new produet development,” noted Stevens. “ You don’t want to create additional uncertainty by the way you manage. The more predictability you ean build into the development environment, the more productive your efforts will he.” Stevens implemented trus philosophy in two steps. First, he and Mahle fixed a date eaeh month, a year in adv ance, when phase rev iews wo uld be held. Project teams approaching a review miles tone thus could alwa ys CDunt on Mahle and Stevens being available, to review their progress o Second , the management team established a schedule, far mto the future, according to which new proclucts would be developed and launched.

“ Of course w e don’t k. now what these specific products will be,” said Stevens. “ But we know the technology will always change, and we know the competition will a1ways be trying to get ahead. H’s like publishing a train sehedule. H helps people to know w hen the next projects are scheduled to leave the station.” ln retrospect, one benefit of setting a “ train schedule” in ad va nce was that there was less c1amoring amongst Medtronic’s marketers to revise objectives to include additional functionality or features after projects had begun. “ ln our troubled days,” recalled Mah. le, “ No ene knew when the next preject was going to be started, let alone tinished. Because Df

this, whenever a competitor carne out with something, or an important physician carne up with an impartant new idea, our marketing people were despeTate to revise the charter of the product currently under development, to include that fearure. If they didn’t get it an this train, w hen would they ever get it?

Once we had a train schedule, they could relaxo li we froze the spec and their fearure ar idea didn’t make it on this one, they mew that in another 18-24 months, all Other train w ould be lea v ing the station, and they could get their idea on that one.” 6. Market Inputs Medtronk a150 systematized the ways in w hich the company got input trom customers, by revitalizing two eight-perso~ p~ ys ician review boards w hich had previously been functioning but which had lost their impact on company policy, for each of Medtronic’s pacemaker lines. These boards met twice each year to give inputs on the performance af existing models, and suggest what functionality and features the company might incorpora te in new models.

“ A big challenge with these boards,” noted Paula Skjefte, was that “ There is a strong tendency just to have experts on our boards. Life would be easier ii we did that, but we wouldn ‘ t be getting the whole pieture. Joe Average Cardiologist only spends about 2% of his praetiee on pacemakers. He’s just not interes ted in spending a whole day on our board advising us about pacemakers. We want to be able to sa tisfy ali the eustomers, Irom the experts who want do their own programming, to the eardiologists who just w ant to get the paeemaker going with no hassle. Taking the pulse of the less demanding end 01 the market is aetually a huge challenge. ” Onee these

boards were prope rl y cons tituted and lunetioning, they beeame criticaI to Medtronic’s ability to define the ri ght paeing systems to meet clinical and cU5tomer needs.

Results To Date

The result of the Medtronlc team ‘ s efforts to put discipline into the Srady Pacing Division’s product developrnent operations ha ve been remarkable, as summarized in Exhibits 2 and 4. The time required to develop new platform products was reduced by 75% between 1986 and 1996. Fully allocated product cost per unit fell 30%. Manufacruring defects per million units dropped by a factor of 4; and the number of field failures over the life of an implant dropped by 90%. And the company’s share Df the Brady Pacemaker m arket increased from Medtromc w as lhe leader in every segmenl of the market.

29%~ in 1986, to 51 ~o in 1996.

From July 1995 lo July 1996, Medtromc replaced 100% of ils produclS with new models. lt was able to access every segment of the marke t, and becarne the highest-volume compentor in each-with ten deriva tive producls built around a single platform lechnology. “ What’s interesting, ” Paula Skjefte observed, “ Is now to see some Df our competitors doing the sarne thing as we did in the past. There is a vicious cyele that almost got us, and is s tarting to hurt them. It looks like Ihis: 1. When Iheir share slarlS lo decline, they starl arguing over “” hal needs to be done and h ow to do it. They start more and more projects in to the system, to placate these di verse opinions. 2. Beca use they aren’t focused , it causes delays, and Medtronic gets its

prod u ct out first. 3. They have to red irect their project to respond to our product, which 510ws them d own. 4. They panic beca u se we are getting way ahead, a nd try to make sure that the flagship prod u ct t h e~· are tryi ng to launch has ali t he features and functions that w ill boos t it ahead af the competition.

5. This takes even longer — forcing the m either to introduce products that are n o t functionally competi tive, ar to rush something into the market that is potentially faulty, just to get something out there. 6. The effect af this is that they spend alI the m on ey required to develop and launc h products, but it is wasted because it does not generate profitable revenue. ” Stevens added, “ People ask us what the secret is, to make a de’el opment orgn ni zati on w ork effectively. I tell lhem there aren’l any magic bullets that kill lhe problems . lt’s jus l discipline. You need to do what yau say needs to be done. Vou need to be in it for the long h aul, There are n o quick fixes. Irs interesting how m an y people leave these conversanons and the n go oH in search Df an easie r. answer from some guru somewhere. It’s amazíng that the obvious isn’ t 50 obvio us.”

Challenges for the Future

Success brought a new set of challenges to the MedITomc tea m, h owever. lntemall y, it vas becoming clear that th e job of chang ing company practices and culture woul d never b e fini sh ed . Stevens noted, for example.. that Medtronic’s career path system constituted Dne of the m os t vex ing cha lle n ges to implementing improve ments . “ When yo ur best people are mov Íng on ever y tv’o or three years, y ou carl never just si t

back a n d say, ‘}t’s w orking.’ Because we’ re always losi. ng the people we’ve trained, the understanding of w ha t we’re doing and why we’re doing it has a ver)’ sh ort half-life. We have to keep training and teaching and coaching. I suppose th at someday these va lues and processes will become 50 ingrained that working this way will ju st be a part D f our culture. Sut we sure aren’t ther e ye t. And probably by the time it gets d eep ly ingra ined h ere, we’ll need to unleam this because something even better has come along.”

“ The new marketing challenges are formidable as well,” Skjefte remarked. “ We’ve always measured the performance of our prod ucts in tenns Df their therapeutic ben efi t — the ex ten t to w ru ch the pacemaker can mimic lhe n ormal functioning of the heart’s electrical system. Now we ha ve dual chamber pacemakers w hose rate varies w ith the patient’s activitj’, whose batte ri es hav e a life far Ionger tha n the life expectancy o f most ímplant recipients. Fifteen yea rs ago pacemakers we re no t programmable. Today, our m os t ad vanced m o dels ha ve 200 parameters, v~l hic h ca n be reprogrammed non-invas ively us ing RF (radio frequenc y) techn oIogy. Today o u r models ca n sense and store ali kinds o f data about irregularities and other abnorm. nl events in a p atient’s hea rt. Doctors can download this data with RF lechnology, simply by placing device near lhe patienl’s chest. How much m ore do we need? I worry that we’re getting to the point that “ better ” will n o Ionger be valued as “ better” by the mainstream ca rdiologis ts. H ow do you devel op a strea m of improved products if customers are genuinely hap py with the performance and features in the

products that th ey have loday? ln the future we’ll need lo change lhe rules of the game. We’ve gol lO figure o ul how to add value in düferent ways.”

“ Catching Up to competitors was a ver)’ different challenge than it is now, to stay a generation ahcad Df them — because now we’re the Dnes needing to define what the product generations musl be,” Don Deyo added. Fortunately for Medtronic, experts continued to forecast strong g rowth for the pacemaker market into the foreseeable future, thanks to the bulge in lhe population most likel y to need pacemakers created by the aging of the relatively prosperous “ baby boom” generation in Westem Europe, Japan and North America. ln addition to trus growth, the large potential markets lor pacemakers in other parts Df Asia, Latin America and Eastern Europe, where economic growth was making advanced medical technology more affordable, defined even greater growth poss ibilities. Trus was especially true if the price 01 pacemakers (currently priced between $2, 000 and $7, 500, depending upon lealures and lunctionality) could be reduced significantly. 11 also appeared in 1996 thal the industry’s competi tive landscape had stabilized.

Whereas 15 lirms had enlered lhe world pacemaker indus try between 1965 and 1980, by 1996 onll’ live 01 them remained. Medtronic claimed half of the market; SI. Jude Medical (Iormerl)’ Siemens) held 23~o; Sulzer lnlermedics 11%; and Guidant (recently divested by Eli Lill y) and Biotronik, a German lirm focusing primarily in developing regions Df the world, each accounted for 8~~). Though several o f these competitors were reeling from the rapid pace of product development that Medtronic had set, they . Vere

capable comparues with substantial financial depth. ln North America in particular, efforts of managed care providers to purchase larger volumes from fewer, highl y capable suppliers with b road product lines, had substantially raised the barriers to future would -be entrants into the indus try.

“ We’ve set some very different goals,” added Steve Mahle. “ We want to bring pacing to less developed countries. This will be a challenge to Medtronic, because our culture won’t allow us to b ring them substandard therapy just to make it affordable. We’ve got to find a way to bring them npproprintc therapy at an affordable price. This will likely involve pc” y advancect technology, and a massive effort at physician education. And we’ve got to figure out how to do ali ot this profitably. ” ln developed countries, where we do 95% Df our volume, our goal is to see that every patient has access not just to pacemaking therapy, but to opfi/JIUHI therapy — where th e technology ln their pacemakers is matched to their disease. For example, ten years ago oruy 30% of patients were receiving dual chamber pacemakers. Today we’re at 50%, but 70% really need them. This requires that we no longer just seU devices,” Mahle continued.

“ We have to educate ph ysicians, and help insurance providers understand that they should reimburse patients for devices that provide optimum therapy. Skjefte described another dimension of the marketing challenge: “ Now that we’ve taken the technological lead, we’ve got to work much more dosely with our customers to understand how to make filem more successful and profitable b y using our products. This m eans not just the p” ysicia/1

customers – cardiologists, electrophysiologists and surgeons — but hospital rr-anagement, payors and buying groups.

Helping these customers become more p rofitable by using Medtronic devices loomed as a huge challenge, because the priority each p laced on various aspects of a pacing system was different, and because the customers themselves often weren't structured to understand what was profitable lor lhem. As an example, Medtronic had recently lost a major accounl, the lntermo untain Ca rdi ology Clinic in Salt Lake City, to a competilor which had undercut Medtronic's pacemaker price by nearly $1, 000 per device. Although the Medtronic device was easier to program as the pacemaker was being installed, those responsible fo r maximizing the prolitability of lhe clinic's " cath lab" (the operating roam where pacemakers were implanted) determined that they would nonethe less maximize the cath lob's profitability b y using lhe less expensive pacemaker.

We've Got Rhythm! Med1ronie Corporation's Cardiae Pacemaker Business

The follow-up of patients wilh newly implanted paeemakers at trus elinie was manaaed different out-patient profit center, however, and for them, use of the competing pacemaker proved much 1Twre expensive. All new pacemakers required some adjustments a few weeks after implantation, to address unique aspeets of eaeh patient's disease and lifestyle. Beeause Medtronie's product reeorded data about the patient's heart funetions within lhe paeemaker itself and allowed physieians to download and analyze trus data and adjust the paeemaker easilr through ' an RF devi ce held dose to

the patient’s chest, all necessary adjustments could be done in a single, 3D-minute visit.

The competitor’s system, in contrast, reguired the panent to visit the out-patient cJinic twice for adjustments, taking approximateJy 1. 5 hours per visit. ln addition, during the time beh,’een these visits (about two weeks) lhe patient had to earry a $500 “ holter monitor” on rus ar her bea 2~ hours per day, whieh recorded lhe heart funetions as detected b y a set of electrodes taped to lhe patient’s chest. These additional monitoring and adjustment costs overwhelmed the m oney saved by purchasing the cheaper pacemaker. But because the savings and added expenses were incurred within two different profit centers of the din. ic, it took enorrnous effort for Medtronic’s sal esforce to M. n back the business. “ These customers not only speak a different language than our traditional physician customers, but their knowledge a, nd preferences are very heavily influenced by wh.: lt pieces o f tht’ therapeutic puzzle they have responsibility for.
Somehow we’ve got to res tructure our s~les and marketing teams to better understand and address their concems.”