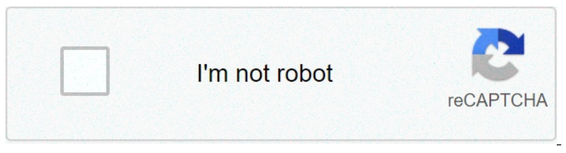

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In today’s hectic and highly competitive world of commercial development of new products, speed and flexibility are essential. Companies are increasingly realizing that the old sequential approach to developing new products just won’t get the job done. Instead, companies in Japan and the United States are using a holistic method, as in rugby, the ball is passed inside the team as it moves as a unit on the field. This holistic approach has six characteristics: integrated instability, self-organizing project teams, overlapping development phases, multi-learning, fine-tuning and organizational transfer of learning. The six pieces fit together like a puzzle, forming a fast flexible process for new product development. Just as important, the new approach can act as an agent of change: it is a vehicle for introducing creative and market-oriented ideas and processes into an old, rigid organization. The rules of the game in the new product development are changing. Many companies have found that it takes more than the accepted basics of high quality, low cost and differentiation to excel in today’s competitive market. It also takes speed and flexibility. This change is reflected in the emphasis that companies are putting on new products as a source of new sales and profits. At 3M, for example, products under five years account for 25% of sales. A 1981 survey of 700 U.S. companies indicated that new products would account for a third of all profits in the 1980s, up from a fifth in the 1970s.1 This new emphasis on speed and flexibility requires a different approach to managing new products. The traditional sequential or “relay race” approach to product development – exemplified by the National Air Force and Space Administration’s Gradual Program Planning (PPP) system – may conflict with the goals of maximum speed and flexibility. or ârugbyâ where a team tries to go the distance as a unit, passing the ball back and forth â can better serve today’s competitive requirements. Under the old approach, a product development process has moved like a relay race, with a group of functional specialists passing the baton to the next group. The project went in sequence from phase to phase: concept development, feasibility testing, product design, development process, pilot production and final production. In this method, functions were specialized and segmented: marketers examined customer needs and perceptions in developing product concepts; R&D engineers selected the appropriate design; production engineers shaped it; and other specialists They brought the stick to different stages of the race. Under the Rugby approach, the product development process emerges from the constant interaction of a multidisciplinary team, which works together from beginning to end. Rather than moving in defined, highly structured phases, the IL It was born from the interaction of team members (see Show 1.) A group of engineers, for example, can start designing the product (stage three) before all the results of the feasibility tests (stage two) are in. Or the team may be forced to reconsider a decision following further information. The team does not stop, but engages in iterative experimentation. This goes on even in the last stages of the development process. Exhibition 1 Sequential (A) vs. Overlap (B and C) Development Stages Exhibit 1 illustrates the difference between the traditional and linear approach to product development and the rugby approach. The sequential approach, called Type A, is typed by the NASA PPP system. The overlapping approach is represented by Type B, where the overlap occurs only at the boundary of the adjacent phases, and Type C, where the overlap extends through several phases. We saw a Type B overlap at Fuji-Xerox and a Type C overlap at Honda and Canon. This approach is essential for companies looking to develop new products quickly and flexibly. Moving from a linear to an integrated approach encourages trial and error and challenges the status quo. It stimulates new types of learning and thinking within the organization at different levels and functions. Just as important, this strategy for product development can act as a change agent for the larger organization. The energy and motivation that the effort produces can spread throughout the large company and begin to break some of the rigidities they have set over time. In this article, we highlight companies in both Japan and the United States that have taken a new approach to managing the product development process. Our research examined multinational companies such as Fuji-Xerox, Canon, Honda, NEC, Epson, Brother, 3M, Xerox, and Hewlett-Packard. We then analyzed the development process of six specific products: FX-3500 medium sized photocopier (introduced by Fuji-Xerox in 1978) PC-10 photocopier for personal use (Canon, 1982) City machine with 1200 cc engine (Honda, 1981) PC 8000 personal computer (NEC, 1979) AE-1 reflex camera (Canon, 1979). 6) Auto Boy, known as Sure Shot in the United States, camera for shutters, (Canon, 1979) We selected each product based on its impact, its visibility within the company as part of a breakthrough development process, the novelty of the product features at the time, the success of the market for the product. product, access to and availability of data on each product. Transfer Scrum Downfield From interviews with members of the organization from CEO to young engineers, we have learned that leading companies show six characteristics in managing their new product development processes: 1. Integrated instability 2. of self-organizing project 3. Overcoming development phases 4. “Multilearning” 5. Thin control 6. Organizational transfer of learning These features are like pieces of a puzzle. Every element, of itself, notOn speed and flexibility. But he took as a whole, the characteristics can produce a new powerful series of dynamics that will make the difference. Integrated instability Top management starts the development process by signaling a general objective or a general strategic direction. It rarely proposes a new product concept or a specific worktop. But it offers the project team a wide margin of freedom and also establishes extremely challenging goals. For example, the Top Management of Fuji-Xerox asked for a radically different photocopier and gave the project team FX-3500 two years to find a car that could be produced at half of the cost of its high-end line and that continued to Work the same way. Top Management creates a tension element in the project team, giving it great freedom to create a project of strategic importance for the company and placing very demanding requirements. A manager responsible for the development of Honda has observed, Â «How to put the team members on the second floor, remove the ladder, and tell them to jump or otherwise. I believe that creativity nasca pushing people against the wall and pushing them almost at extreme " InformationÂ »Where the previous knowledge does not apply. The ambiguitous and fluctuation abound in this state. Let to boil, the process starts creating your own dynamic order.2 The project team starts operating as a start-up, takes initiatives and risks and develops an independent agenda. At one point, the team begins to create their own concept. A group has a self-organization capacity when it exhibits three conditions: autonomy, auto-transcendence and cross-fertilization. In our study of the various development teams of new products, we found all three conditions. Autonomy. The involvement of the headquarters is limited to providing orientation, money and moral support from the beginning. In everyday life, the upper management intervenes rarely; The team is free to establish its own direction. In a sense, high leadership acts as a venture capitalist. Or, as a manager said, "We open the bag but we keep my mouth closed." This type of autonomy was evident when IBM developed its personal computer. A small group of engineers started working on the car in a warrant warehouse in the remote Boca Raton, Florida. Except for quarterly corporate reviews, Armonk headquarters, New York has allowed Boca Raton group to operate on their own. The group obtained the green light to take non-conventional measures such as the selection of external suppliers for its microprocessor and software package. We have observed other examples of autonomy in our case studies: team of the honda city project, whose members were 27 years old, had received instructions from the management: to develop “the type of car that young people would like to drive.” »As us to design a car with a totally new concept and gave us the freedom to do it our way. Â »A small group of sales engineers that originally sold microprocessors built PC 8000 to the NEC. The group started without knowledge of personal computers. Ã ¢ â,¬ "We received the front street from the top management to proceed with the project, as long as we would develop the product from ourselves and also be responsible for production, sale and maintenance alone, Ã ¢ â,¬" He observed the project "â" ¢ s Head. Auto-transcendence. The project teams seem to absorb in an endless research for "the limit. Starting from the guidelines established by Top Management, they begin to establish their goals and continue to rise throughout the development process. By pursuing what appears at first to be contradictory goals, devise ways to ignore the status quo and make the great discovery. We have observed many examples of self-transcendence into our field work. The Canon AE-1 project team has launched new ideas to meet the challenging parameters established by the Top Management. The company has asked the team to develop a high quality automatic exposure camera that had to be compact, light, easy to use and a price of 30% lower than the prevailing price of single lens cameras. To achieve this ambitious goal, the project team reached several first design and production of cameras: an electronic brain consisting of integrated circuits tailor-made by Texas Instruments; Modular production, which made automation and mass production possible; and reduction in the number of parts of 30% to 40%. Ã ¢ â,¬ "It was a struggle because we had to deny our way of thinking traditional, Ã ¢ â,¬" recalled the head of the AE-1 team. Ã ¢ â,¬ "But we do it every day in the standing parts of our activity, Ã ¢ â,¬" Another Canon executive replied. The entire organization makes everyday and incremental improvements to strengthen what the president calls Ã ¢ â,¬ "Fundamentals": research and development, production technology, sale of prowess and corporate culture. The city project team of Honda also obtained a breakthrough by transcending the status quo. The team was asked to develop a car with two competitive features for the youth segment: efficiency in resources and fuel and quality without compromise at a low price. The natural instinct of the team was to develop a resized version of the most sold civic model of Honda. But after so much debate, the team decided to develop a car with a totally new concept. He challenged the prevailing idea that a car should be long and low and designed a "short and high" car. Convinced that an evolution towards a minimum machine " It was inevitable, the team was to run the risk of going against industry standards. Cross-fertilisation. A project team made up of members with different functional specializations, thought processes and behavioural models carry out new product developments. The Honda team, for example, consisted of hand-picked members from R & D, manufacturing, manufacturing, Come on. The company went beyond a step forward by putting a wide variety of personalities on the team. This diversity has favoured new ideas and concepts. During the selection of a diversified team it is fundamental, it is not animo until members begin to interact in reality that cross fertilization actually takes place. Fuji-Xerox has identified the multifunctional team that the construction of the FX-3500 includes members of planning, design, production, sales, distribution and evaluation departments - in a large room. A project member gave the following logic for this step: â€ "When all team members are in a large room, your information becomes yours, without even trying. So start thinking in terms of better or the second best for the group in general and not just where you are. If everyone understands the position of the other person, each of us is more willing to give in, or at least to try to talk to each other. The initiatives emerge as a result. Â »The development phases overlap the team's self-organizer character produces a unique dynamic or rhythm. Although team members start the project with different time horizons, with the people of research and development who have the longest time horizon and the shorter production people ... Everyone has to work to synchronize their pace to meet deadlines. In addition, while the project team starts from â€ œzero information ", â€" each member begins to share knowledge of the market and the technical community. As a result, the team starts working as a unit. At one point, the individual and all become inseparable. The rhythm of the individual and the rhythm of the group begin to overlap, creating a completely new impulse. This impulse acts as a driving force and moves the team forward. But the rapidity of the wrist varies in different stages of development. The rhythm seems to be more vigorous in the early stages and calibration towards the end. A member of Canon's PC-10 development team described this rhythm as follows: â€ "When we discuss what kind of concept to create, our minds descend in different directions and list alternatives. But when we are trying to come and take it with the accounts with achieving both low cost and high reliability, our minds work to integrate the various views. The conflict tends to occur when some are trying to differentiate and others are trying to integrate. The sack is in creating this rhythm and knowing when to move from one state to another. "Under the sequential approach or relays, a project passes through different stages in a step-by-step phase, passing from one stage to next only after all the requirements of the previous phase are met. These checkpoints control the risk. But to the sameThis approach leaves little room for integration. A bottleneck at a stage can slow down or even stop the entire development process. Under the holistic approach or rugby, the phases overlap considerably, which allows the Group to absorb the vibration or "NOISE" generated throughout the wholetrial. When a bottleneck appears, the noise level obviously increases. But the process doesn’t stop suddenly; the team manages to push forward. Fuji-Xerox inherited the PPP system (see Type A in Exhibit 1) from its parent company, but revised it in two ways. First, it reduced the number of stages from six to four by redefining some of the stages and aggregating them differently. Second, he changed the linear and sequential system into the so-called “sashimi” system. Sashimi is slices of raw fish placed on a plate, one slice overlapping the other (see Exhibit 2.) Fuji-Xerox Product Development Program The sashimi system requires extensive interaction not only between project members, but also with suppliers. The FX-3500 team invited them to participate in the project at the beginning (which eventually produced 90% of the parts for the model). Each side regularly visited each other’s plants and kept the information channel open at all times. This kind of exchange and openness, both within the design team and with vendors, increases speed and flexibility. Fuji-Xerox has shortened development time from 38 months for an earlier model to 29 months for the FX-3500. If sashimi defines the Fuji-Xerox approach, rugby describes the overlap to the Honda. As a rugby team, Honda core project members remain intact from start to finish and are responsible for combining all the stages. In the relay PPP system, critical problems tend to occur at the points where one group passes the project to the next. The rugby approach facilitates this problem by maintaining continuity through the stages. The Auto Boy project continued with a lot of overlap even in phases. Canon’s design engineers remained alert during the process to make sure their design was converted into what they had in mind. Manufacturers intruded on the turf of design engineers to make sure the design was consistent with economies of scale of production. The overlapping approach has merits and demerits. Greater speed and greater flexibility are the âœœdifficultâ merits. But the approach also has a number of “soft” merits to human resource management. The overlapping approach increases shared responsibility and cooperation, stimulates involvement and commitment, sharpens a problem-solving focus, encourages initiative-taking, develops diversified skills and increases sensitivity to market conditions. The most obvious demerits derive from having to manage an intensive process. Problems include communicating with the entire project team, maintaining close contact with suppliers, preparing various contingency plans and managing surprises. This approach also creates more tension and conflict in the group. As a member of the project rightly puts it, “If From the development thinks that 1 in 100 is good, this is a clear sign to move forward. But if someone in production thinks that 1 in 100 is not good, we have To start everywhere. This gap in perception creates conflict. Â »The overlapping of the phases also away with traditional notions on the division of work. The division of work works well in a type A system, in which the management clearly outlines the tasks, expects all the members of the project to know their responsibilities and currency each on an individual basis. Under a B or C type system, the company carries out the tasks through what we call Ã ¢ â,¬ Å "shared Division of Labor," where every team member feels responsible for "and is able to work on" Any aspect of the project. Multylearning because the members of the project team remain in close contact with external sources of information, can quickly respond to the change in market conditions. Team members are committed to a continuous trial and error process to restrict The number of alternatives that must consider. They also acquire ample knowledge and different skills, which help create a versatile team able to quickly resolve a series of problems. This learning is doing it is manifested along two dimensions: through more levels (individual, group and corporate) and through multiple functions. We refer to these two learning dimensions as Ã ¢ â,¬ Å "Multileearning.Ã ¢ â,¬ learn NTO multilevel. Individual learning takes place in a number of ways. 3M, for example, encourages engineers to dedicate 15% of their company time to pursue their Ã ¢ â,¬ Å "Dream.Ã ¢ â,¬ Canon uses equal pressure to promote individual learning. A design engineer for the PC-10 project explained, Ã ¢ â,¬ "My senior managers and some of my colleagues study really hard. There is no way I can compete with them in the number of books reading . So every time I have time, I go to a department store and spend several hours in the toy department. I look what it sells and controls the new gadgets used in toys. They can give me a suggestion or two later. Learning is pursued with emphatically at group level. Honda, for example, Haviato several members of the city project team in Europe for three weeks when the project reached a blind alley in the development phase of the concept. They were simply told about Ã ¢ â,¬ "Look around for what happened in Europe." The Mini-CooperÃ ¢ â,¬ "a small car was developed decades ago in the UK" which had a great impact on their design philosophy. While the PC-10 copier was developing, the Canon team members left the project offices to keep a number of meetings in nearby hotels. In one of the first meetings, the whole project team was discontinued in the subgroups, each with a representative of the team of design and team of Each subgroup was told to calculate the cost of a key part and understand ways to reduce that cost of a third. Ã ¢ â,¬ "Since each subgroup faced the same mandate and the same term, we had no choice, Ã ¢ â,¬" recalled a member of the project. Learning took place quickly. Business learning is better realized by establishing a movement or a company on a company level. Company. For example, he used the Total Quality Control movement (TQC) as a basis for changing the corporate mentality. TQC It is designed to increase the sensitivity of the entire organization towards the simultaneous improvement of quality and productivity, market orientation, cost reduction and simplification of work. To achieve these goals, everyone in the organization had to learn the basics of techniques such as statistical quality control and value engineering. Hewlett-Packard has embarked on a four-phase training program in marketing as part of the company’s goal to become more market oriented. The company now involves high-level academics and business consultants to spread the marketing message. It also applies techniques borrowed from the packaged consumer goods industry, such as interviews with discussion groups, quantitative market research and marketing tests. In addition, the company has created a business marketing division to accelerate what an internal employee calls “the transition from a company managed by engineers to a company with a greater focus on marketing”. Multifunctional learning. Experts are encouraged to accumulate experience in sectors other than theirs. For example: all the project members who developed the first Epson miniprinter were mechanical engineers who initially knew little about electronics. So the head of the project team, also mechanical engineer, returned to his university as a researcher and studied electrical engineering for two years. He did it while the project was underway. Once the mini-printing project is finished, all engineers knew the electronics well. "I give my employees an expert in two technological fields and two functional areas, such as design and marketing," said the leader. “Even in a engineering-oriented company like ours, we cannot go ahead without the ability to predict market developments. The team working at the NEC PC 8000 was made up of commercial technicians from the Electronic Device Division. They have acquired much of the know-how necessary to develop the company’s first personal computer by putting together the TK 80, a computer kit, and introducing it on the market two years before the PC 8000; and setting up for about a year, also on weekends, at the BIT-IN, a NEC service center in the center of Akihabara, talking with hobbyists and learning users. point of view. These examples demonstrate the important role played by multilearning in the company’s global human resource management program. It encourages initiative and learning through employee practice and helps keep them updated on the latest developments. It also serves as a basis for creating a climate that can lead to a transitionSome companies are already making progress in accelerating the development of new products: Xerox spent three years developing a new copyer, the 9900, while the company spent more than five years developing a similar model. A portable brotherEP-20 - was developed in less than two years. He took the company more than four years to develop a previous model. One of the main priorities of John Sculley, when appointed Apple President in 1984, was to cut the product development time of the company from 3.5 years up to one year. Other organizations are beginning to add flexibility to product development: Black & Decker has recently presented 50 new electrical products at the national hardware show in Chicago to compete more effectively with Japanese electric tool manufacturers. When Yamaha threatened his leadership position in the Japanese market in 1982, Honda sparked about 30 new motorcycle models within a six-month period. IBM broke from its tradition of designing everything internally and used a microprocessor designed by Intel Corporation and a basic operating system designed by Microsoft Corporation to develop their own personal computer. Thin control although the project teams are largely alone, they are not uncontrolled. Management establishes enough checkpoint to prevent instability, ambiguitous and tension from contacting chaos. At the same time, the direction avoids the kind of rigid control that compromises creativity and spontaneousness. Instead, the emphasis is in Ã ¢ â,¬ Å "self-control, Ã ¢ â,¬ å" Control through peer pressure, Ã ¢ â,¬ and Ã ¢ â,¬ å "Control for love" , which collectively call Ã ¢ â,¬ Å "SULE CONTROL.Ã, â,¬ subtle Control is exercised in the new product development process in seven ways: 1. Selection of right people for the project team while monitoring the Changes in group dynamics and adding or decreasing members when necessary. Ã ¢ â,¬ "We would have to add a more older and conservative member of the team if the balance changed too much towards radicalism," said an Executive Honda. Ã ¢ Â, ¬ "Carefully card members of the project after a long resolution. We analyze the different personalities to see if they agree. Most people get along, thanks to our common values series. â € ¢ Create an open work environment, as in the case of Fuji-Xerox. 3. Encourage engineers to go out into the field and listen what customers and retailers must say. Ã ¢ â,¬ "A design engineer could be tempted to do the simple way out sometimes, but can reflect on what the customer has to say and try to find a way to meet that requirement, Ã ¢ Â, ¬ "Noted an engineer from Fuji-Xerox. 4. Establish a group performance assessment and premium system. Canon, for example, required for patents for PC-10 project products on a group basis. 5. Manage rhythm differences during the development process. As mentioned above, the rhythm is more vigorous in the early stages and tans towards the end. 6. tolerate Anticipate errors. Honda engineers love to say that "a success rate of 1% is supported by errors made the â €

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