Metrics for Innovation Success

NEW PRODUCT INNOVATION
No. 10 in a Series of Papers

Reference Paper by:
Teresa Jurgens-Kowal
PhD, PE, NPDP

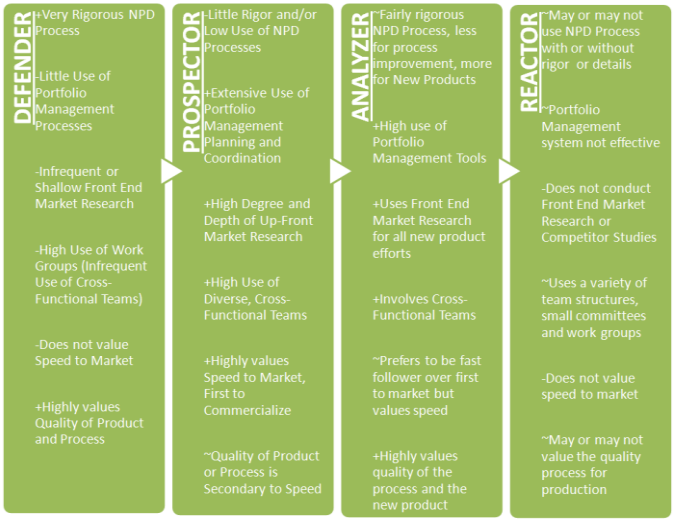
Global NP Solutions
2323 Clear Lake City Blvd., #180
Suite 177
Houston, TX 77062
PHONE: 281-280-8717
FAX: 281-280-8689

STRATEGY TYPES REVIEW

One of the most commonly used strategy assessment tools compares an innovation organization to one of four Miles & Snow strategy types [(1)]. Not surprisingly, each idealized strategy type approaches New Product Development differently in its response to environmental, market, or technological changes. Here we review how each of these Miles & Snow strategy typology companies *might respond to several of the key aspects of an effective NPD program:*

- Rigor of NPD Process (utilization of and flexibility of the process),
- Portfolio Management tools utilized for decision making,
- Extent of front-end Market Research,
- Cross-Functional Teams (used throughout the NPD project),
- Speed to Market,
- Product and Process Quality (emphasis on quality over other product or process attributes).

Generally, a Defender firm values stability, cost efficiency, and centralized control. Therefore, it is not surprising that they would implement and enforce very strict NPD Processes through **checklists, reviews, and extensive project evaluations.** Because the *Defender* is working in a niche market and competing primarily on price, the company cannot afford to let quality slip in either the product or the manufacturing process. Other aspects of New Product Innovation, such as use of Portfolio Management tools, are not so important to a *Defender* firm, since **decisions are made by a centralized, authoritarian group** and since most projects will involve only incremental improvements as *derivatives or enhancements* to the company's very strong *core technology.*



On the opposite end of the continuum, the Prospector firm will be most interested in **speed to market** variables since this type of strategy **values being "first".** The *Prospector* will engage with their customers in *early*

market research to a high degree so that they can deliver new ideas to the marketplace rapidly. Because a high degree of coordination across many technology platforms is required, the *Prospector* firm is more likely to use Portfolio Management tools; however, elements of Portfolio Management, such as *mix and balance may be missing from their analyses*. Finally, since the *Prospector* strategy addresses *engineering and administrative problems* by employing generalists rather than specialists, **cross-functional teams are nearly always active** in their NPD efforts.

Next, straddling their dual role as Defender and Prospector, the Analyzer firm may also show dualities in implementation of some key NPD elements. For example, they may use a good deal of *rigor to have a new idea enter into the NPD process* for development and prototyping, yet process improvements in the base technologies may be *implemented without much senior management review* in order to **achieve product cost efficiencies**. Again, since *planning is very important* to successful implementation of an *Analyzer* strategy, these firms **will use Portfolio Management tools both effectively and extensively.** Market Research will be thorough, and cross-functional teams, especially involving operations and manufacturing teams, will be used on most NPD projects. Speed to market is important because the *Analyzer* wants to gain market share versus their competitors; however, because quality of the product and process is important, they **will not rush to commercialization** until satisfied with all elements of production. Often, the *Analyzer* organization will be a Fast Follower to the market, rapidly launching a new product just behind a competing Prospector firm.

Lastly, Reactor organizations will tend to have **a "shot-gun" approach to NPD** depending on the industry, maturity of the firm, and historical past performance. For example, a *Reactor* organization that is forced into innovation by a corporate dictate *may use a rigorous NPD process but fail to implement cross-functional teams.* Or a firm that was formerly a Defender organization but finds itself in the midst of radical technological change may value quality of the production

process very highly but be *unable to implement an NPD Process to ensure future innovations* follow past performance.

HOW TO USE STRATEGY TYPES

Strategy typologies are most useful as general, conceptual categorizations [3] to provide an understanding of how your firm is measuring up to its formal mission and vision statements. Each of Miles & Snow's strategy types, save the Reactor, can be successful in certain markets with the appropriate technologies, and with clear responses to environmental changes. Of course, firms will have commonalities and differences in strategy typology elements [5], but most companies will find their intentional or unintentional innovation strategies will naturally fall into one of Miles & Snow's types.

For example, pricing after implementation of a new technology is not necessarily found to correlate with a specific strategy typology. A Prospector firm may expect to reap profits from a near monopoly operation when a New-to-the-World product is first introduced by actively seeking new opportunities in new markets [4]. Instead, over the long run, the pricing advantage occurs only when a *customer views that a new technology offers differentiation* or a benefit to the customer's firm [4].

Additionally, organizations tend to express their strategic typology in the types and scale of New Product Development projects. Specifically, as Manion and Cherion [5] show the close relationship between NPD project type to the degree of newness to the firm. Products that are "New-to-the-World" will have a high degree of newness not only to the firm, but also a high degree of newness in the market. Of course, these projects are *attractive to a Prospector company whose goal is strategic diversification.*

Gaining a deeper understanding of your organizations' institutionalized, or automatic in-grained, internal responses to external pressures will help **guide the company to take advantage of markets, technologies, and competition** in ways that the structure of the firm is best suited to do. Identifying which strategic typology best matches your firm's response to change *helps to shape and form the decision-making process.* Finally,

implementation of specific elements of the strategy typology or redirection in strategic vision can help to build or refine the organizational structure to *better achieve and measure success objectives and project milestones*.

LINK OF STRATEGY TYPES WITH NPD SUCCESS METRICS

Strategy is one of the two most important drivers for NPD success [6]. However, because the type of NPD projects which are undertaken are also an expression of the organization's strategic typology, innovation metrics will vary from firm-to-firm [5]. Typical linkages between strategy and preferred metrics of successful innovation are discussed below. A Defender organization which pursues stable product lines and penetration of existing markets will focus on somewhat different metrics than a typical Prospector firm, for example.

DEFENDER

Because the *Defender* firm is working to *protect its market domain* through high quality, superior service, or lower prices, one of the most important metrics is whether the **new product fits the business strategy**. Our idealized Defender company, Queen Royal Plastics, for example, will measure whether the *single core technology* can deliver a new product with *minimum capital investment* and without disruption to the existing product line.

One particular measure of success that is commonly used by *Defender* firms, is the Return on Investment (ROI). An ROI estimate during program development will involve gathering estimated sales and revenue data, subtracting expected costs to generate an estimated profit, and then dividing by the expected (or actual) capital investment. Many *Defender* firms will set a "hurdle rate" for new product development ROI that is quite high, up to 20 or 30% in order to maintain the *single technology platform in the stable, niche market*.

A disadvantage of tracking ROI metrics is that aging factories are *fully depreciated*, so adding any new product to the portfolio will result in extremely high investment with a commensurately low ROI. **Defender firms risk obsolescence** if they fail to introduce new products periodically and if they fail to continue to invest in the production facility. Fortunately, the Defender firm is more than twice as likely (40% of new products vs. 21%) to offer product line additions as is a

Prospector firm, [7] thus extending the life cycle of the product platform.

PROSPECTOR

In contrast to the Defender firm, the *Prospector firm values being "first" to market*, so its primary measure of success involves whether the products of today will lead to future opportunities. In fact, the Prospector firm will introduce nearly six times as many "new-to-the-world" products as will a Defender firm (30% of portfolio vs. 5%) [4]. Measures for a *Prospector* firm will be consistent with changing product lines and early market entry [5]. Innovation, also a high priority, may be tracked through metrics such as **number of new patents issued** over a period (quarter or year), as well as benchmarking patent portfolios with nearest competitors to ensure the *Prospector* firm is *"winning" with the most new technologies*.

For the "bean counters" at the *Prospector* firm that require additional objective metrics, the company may look at **number of new products released during each period** as well as percent of sales from products less than 3 years old. The metric will vary slightly, for example, to include **percent of sales from products released during the last 5 years** or percent of product portfolio less than x years old, depending on the expected life cycle of each new product line.

A disadvantage of measuring only new product profit over the most recent years will discount those products that have staying power in the market, resulting in longer commercial life cycles.

ANALYZER

Again balancing the hybrid nature of maintaining stability in operations but innovating as a Fast Follower, the *Analyzer* firm balances metrics, as expected, between those of the Defender and the Prospector. However, the *Analyzer* firm will tend to focus more closely on projects that have a lower degree of newness in the marketplace as compared to a Prospector firm [4].

An important metric to the *Analyzer* firm is the **rate of success for new products in the marketplace**. These measures will include *fit with business strategy* as well as the

development program ROI. An NPD project that is considered "too expensive" will not likely be followed with another similar NPD project until the *Analyzer* firm can discern the full details of the "failure" by one of many rigorous analyses.

On a more mathematical level, the analyzer will be interested in the **percent of profits from products that are newly released** (e.g. less than 3 or 5 years old). Notice that the Prospector will look at sales or revenue in addition to profit, but the duality of the *Analyzer* firm's strategic nature will require a *focus on profit* instead of just sales, since *cost efficiency* in manufacturing continues to be a driving principle for the *Analyzer* firm.

REACTOR

With no specific new product development strategy, the *Reactor* firm will look to **subjective measures of project success**. If any metrics are tracked, the development program ROI may be reported. The disadvantage is, of course, that the ROI is not necessarily representative of success in the marketplace if the research and development investment was not focused for efficiency in the first instance.

CONCLUSION

Some key metrics are presented in the table below, along with the key characteristics of each Miles & Snow strategy type.

Thus, it is important to match your metrics with the organization's strategy type for meaningful analysis. If the metrics are not closely aligned with strategy, the firm may be meeting goals but failing to acknowledge success by measuring against an inconsistent or incongruous target. Using strategy based

Strategy Type	Key Metrics
Defender	
• Locate and try to maintain a niche in a relatively stable product or service area • Protect domain through high quality, superior service, or lower prices • May retrench if the marketing environment becomes uncertain	• Development program ROI • Degree that new products fit the business strategy
Prospector	
• Value being "first" even though not all efforts are profitable • Seek to innovate, take risks, seek out new opportunities and grow • Readily adopts new technologies	• Percent of sales and/or profits from products that are less than "x" years old, release in past "y" years • Degree that products of today lead to future opportunities
Analyzer	
• Seldom "first" but often have better products • Try to maintain stability in operations, but want to innovate at "edges" of the markets • Want to develop internal efficiencies and product reliable, high quality products • Monitors competitors and can often bring more cost-effective products	• Degree that new products fit the business strategy • Development program ROI • Percent of profits from products that are less than "x" years old • Success / Failure rates
Reactor	
• Not as aggressive as competitors in maintaining established products and markets • Responds only when forced by strong environmental pressures, develops only incremental improvements • Don't really have a strategy at all. Simply react or respond to whatever is happening in the market environment at that time.	• Development program ROI • Subjective overall program success

metrics can also streamline the post-launch process substantially, since the NPD teams will be experienced with the data for the metric as well as aligned with the project and product goals, throughout the NPD life cycle.

Finally, strategy and metrics do not assure NPD success. Aligning metrics with strategy will, however, allow the firm to **ensure objectives are met**, but product differentiation continues to be the other primary leading indicator of market success.

QUICK REFERENCE GLOSSARY

Check our website for a quick and easy list of terms used in New Product Development. Some terms used in this article are shown here.

Analyzer: A firm that follows an imitative innovation strategy, where the goal is to get to market with an equivalent or slightly better product very quickly once someone else opens up the market, rather than to be first to market with new products or technologies. Sometimes called an imitator or a "fast follower."

Cross-Functional Team: A team consisting of representatives from the various functions involved in product development, usually including members from all key functions required to deliver a successful product, typically including marketing, engineering, manufacturing/operations, finance, purchasing, customer support, and quality. The team is empowered by the departments to represent each function's perspective in the development process.

Defender: A firm that stakes out a product turf and protects it by whatever means, not necessarily through developing new products.

Fast Follower: A firm or organization that is adept at improving existing technologies through incremental innovation in both product and process technologies. Often offers a product or pricing advantage over the first-to-market competitor.

Innovation Strategy: The firm's positioning for developing New Technologies and Products.

Market Research: Information about the firm's customers, competitors, or markets. Information may be from secondary sources (already published and publicly available) or primary sources (from customers themselves). Market research may be qualitative in nature, or quantitative.

New Product Development (NPD): The overall process of Strategy, Organization, Concept Generation, Product and Marketing Plan creating and evaluation, and Commercialization of a New Product.

New Product Development Process (NPD Process): A disciplined and defined set of tasks and steps that describe the normal means by which a company repetitively converts embryonic ideas into salable products or services.

New-to-the-World: A good or service that has never before been available to either consumers or producers. The automobile was new-to-the-world when it was introduced, as were microwave ovens and pet rocks.

Portfolio Management: A business process by which a business unit decides on the mix of active projects, staffing and dollar budget allocated to each project currently being undertaken.

Prospectors: A firm that leads in technology, product and market development and commercialization, even though an individual product may not lead to profits. Their general goal is to be first to market with any particular innovation.

Reactors: A firm that has no coherent innovation strategy. They only develop new products when absolutely forced to by the competitive situation.

Return on Investment (ROI): A standard measure of project profitability, this is the discounted profits over the life of the project expressed as a percentage of initial investment.

WORKS CITED

1. **Miles, Raymond E. and Snow, Charles C.** *Organizational Strategy, Structure, and Process.* New York : McGraww-Hill, 1978.

2. *Miles and Snow's Typology of Strategy, Perceived Environmental Uncertainty, and Organizational Performance.* **Namiki, Nobuaski.** June 22, 1989, Akron Business and Economic Review.

3. *Strategic Orientation, Organizational Structure, and the Associated Effects on Performance in Industrial Firms.* **Pleshko, Larry and Nickerson, Inge.** 2008, Academy of Strategic Management Journal, Vol. Annual.

4. *Impact of Strategic Type on Success Measures for Product Development Projects.* **Manion, Michael T and Cherion, Joesph.** s.l. : Product Development and Management Association, 2009, Journal of Product Innovation Management, Vol. 26, pp. 71-85.

5. *Strategic orientation, organisational structure, and the associated effects on performance.* **Pleshko, Larry P.** 1, s.l. : Palgrave Macmillan Ltd., 2007, Journal of Financial Services Marketing, Vol. 12, pp. 53-64.

6. *Determinants of New Product Performance: A Review and Meta-Analysis.* **Montoya-Weiss, Mitzi M and Calantone, Roger.** New York : Product Development and Management Association, 1994, Journal Product Innovation Management, Vol. 11, pp. 397-417.

7. *PDMA Success Measurement Project: Recommended Measures for Product Development Success and Failure.* **Griffin, Abbie and Page, Albert L.** New York : Product Development and Management Association, 1996, Journal Product Innovation Management, Vol. 13, pp. 478-496.

ABOUT THE AUTHOR

Teresa is President of Global NP Solutions, LLC, a strategic innovation provider. She is an accomplished visionary and results-oriented professional with extensive industry experience from creative research to effective portfolio management through stream-lined new product development processes.

Prior to founding Global NP Solutions, Dr. Jurgens-Kowal acquired over 12 years of experience in leadership and management positions with ExxonMobil Chemical Company and a total of 16 years as a practicing Chemical Engineer. Her corporate career encompassed various functions, including New Product Development, Portfolio Management, Licensing, Marketing, Logistics and Supply Chain, Manufacturing, Project Management and Research Technology.

Teresa has extensive experience leading successful teams, managing the product development life cycle, and defining the portfolio strategy. Her deep expertise in intellectual property management, product and process licensing, portfolio planning, customer service and various business processes make her an ideal teacher and trusted advisor who knows both the theory and practices of New Product Development.

Dr. Jurgens-Kowal earned a B.S. degree in Chemical Engineering from the University of Idaho in Moscow, Idaho and a Ph.D. in Chemical Engineering from the University of Washington in Seattle, Washington. She is a licensed Professional Engineer in the State of Louisiana since 1998. Teresa is a certified New Product Development Professional (NPDP) by the Product Development Management Association (PDMA) and Global NP Solutions, LLC, is a Registered Education Provider (REP) with PDMA.

Teresa holds chemical process and catalyst patents, and is published in the Journal of the American Chemical Society and Journal of Physical Chemistry.

Currently, Dr. Jurgens-Kowal is working on founding a Gulf Coast Chapter of the PDMA organization. She has an office in Houston, Texas.