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MANAGEMENT OF INNOVATIVE RISKS

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Для сучасних економічних систем характерним є підвищення невизначеності їх поведінки в силу ускладнення і прискорення протікаючих в них процесів і збільшення масштабів наслідків прийнятих рішень. Особливе значення це має у відношенні процесів, пов'язаних з освоєнням інновацій, як визначального чинника економічного розвитку організації. Об'єктивне та своєчасне виявлення та оцінка ризиків стає визначальною умовою успішності прийнятих управлінських рішень та інноваційних проектів в цілому. Використовувані методи і способи оцінки ризиків реалізації інноваційних проектів, а також застосування їх на практиці носять, як правило, розрізнений характер, що не завжди дозволяє провести порівняльний аналіз різних проектів з точки зору їхньої ефективності та доцільності.

Ключові слова: управління, ризик, інновація, система менеджменту, інноваційний проект, економічний розвиток

Продиус Ю.И., Бусари О.Р. Управление инновационными рисками.

Для экономических систем современности характерно повышение неопределенности их поведения в силу осложнения и ускорения протекающих в них процессов и увеличение масштабов последствий принятых решений. Особое значение это имеет в отношении процессов, связанных с освоением инноваций, как определяющего фактора экономического развития организации. Объективное и своевременное выявление и оценка рисков становится определяющим условием успешности принимаемых управленческих решений и инновационных проектов в целом. Используемые методы и способы оценки рисков реализации инновационных проектов, а также применение их на практике носят, как правило, разрозненный характер, что не всегда позволяет провести сравнительный анализ различных проектов с точки зрения их эффективности и целесообразности.

Ключевые слова: управление, риск, инновация, система менеджмента, инновационный проект, экономическое развитие

Prodius Y.I., Busari O.R. Management of Innovative Risks.

For economies of today are characterized by increasing uncertainty of their behavior because of complications and accelerate the processes occurring in them and increase in the consequences of decisions. Of particular importance is the case with regard to processes associated with the development of innovation as a determining factor in economic development organization. Objective and timely identification and risk assessment is crucial prerequisite for the success of management decisions and innovation in general. Methods used risk assessment methods and the implementation of innovative projects and their application in practice are usually fragmented nature, which does not always allow a comparative analysis of different projects in terms of their effectiveness and efficiency.

Keywords: management, risk, innovation, management system, innovation project, economic development

Innovation and risk management seemingly do not naturally go hand-in-hand in many peoples' minds – although we would argue that it should. We have been exploring the benefits of better connecting the two functions and as a result, Wouter is contributing to this column.

What we have observed is that many people think a typical start-up – with its highly independent and empowered teams, agile development, minimal controls and executives who need to gain market share and have less to lose – is the ideal incubator for innovation. The opposite case could be made for a large organization, with a carefully structured risk management function.

In our experience however, it doesn't have to be that way – nor is it. We increasingly see innovation and risk management being viewed as partners, not adversaries. When properly fused, the two disciplines can help organizations pursue opportunities that a risk-averse culture might leave on the cutting room floor. Risk management can help foster a company's innovation agenda by revealing blind spots and areas of underinvestment that threaten the upside of a company's future [2].

Analysis of recent researches and publications

Both in Ukraine and abroad the management of innovation is a significant amount of research. Innovative risk research of Russian scientists can be found, with works of such scientists as: V. Geeta, P. Kovalishin, M. Chuhno, V. Stadnyk, V. Seminozhenko, L. Fedulova. Unfortunately, these authors in his writings do not give a single definition to such risks and the more differ in views on the classification of innovative risks.

Unsolved aspects of the problem

Therefore, in today's literary sources, the authors not only can't agree on the very definition of essence of innovative risk, but there is no single approach for classification and structuring of the entire subsystem of this type of risk.

The aim of the article is the qualitative and quantitative evaluation and application of methods of risk minimization, avoidance or prevention, which with some probability may arise during the implementation of the innovative project.

The main part

Many companies have established "stage gates", essentially a funneling process designed to reduce

uncertainty as exposure to risk grows. In many cases, however, the stage gating process is too focused on re-enforcing what the company does well today and the funnels end up producing only weak, incremental ideas that come to market slowly and lack emphasis on new areas for expansion. Without a strong link to risk management capabilities, stage gates often become risk averse and weed out big ideas in favor of small ones. Decision-making bodies may send back proposals for additional research and work, creating time-consuming, creativity-numbing rework loops – as opposed to getting early insight on how potential challenges can be addressed to give confidence to the idea.

Ironically, another common impediment to innovation is an existing corporate culture that overly celebrates and rewards success. In these cultures, it is rare to find someone who has been able to rise in the ranks with a failed experiment on his or her resume, even if the failure provided valuable insights about future opportunities.

Venture capital firms – typically designed to manage risk and encourage innovation – can provide some important lessons for large organizations seeking to advance the cause of innovation. These firms typically create a portfolio of investments and engage with the management team through the development process regarding new insights and unanticipated opportunities resulting from new learnings in the process. These firms also know in advance that most experiments will fail.

Innovation can be a company's most powerful tool and a key driver of value. Yet many executives, fearful of the risks inherent in pursuing edgy new ideas that may not succeed, hesitate to unleash its full potential. They prefer, indeed, to renovate rather than to innovate. For example, fully 64% of the 519 companies in our innovation survey shows that a cross-industry sample of US, UK and French players are still focusing largely on line extensions. Only 20 percent view their innovation efforts as potential game changers. And just 18% say they are using innovation to drive competitive advantage [4].

Some, of course, would argue that responsible risk management necessitates a cautious approach to innovation. Only startups, they say, can afford to court the risk of failure. Global companies are complex entities, held together by a web of controls. Loosening those controls to give innovation teams free rein could incur unacceptable risks and costs, not only for the company but for its various stakeholders as well.

That's why so many big companies opt to reduce uncertainty by leveraging a traditional, stage-gate innovation process. Stage gates are designed to identify the best ideas by putting them through multiple reviews, or gates. In principle, there's absolutely nothing wrong with the concept – quite the contrary. Stage gates provide a discipline and a structure for identifying problems early in a project's life, and allow the project's sponsors to keep constant track of the evolving business case.

The problem, however, is the evaluation criteria typically used at each gate. Few decision makers want to take responsibility for a failed experiment, so extreme caution usually prevails when new ideas are assessed. Opportunities tend to be defined narrowly. Moreover, the tools commonly used to support the process exacerbate the problem. Based on retrospective analytics – Net Present Value (NPV) models, for instance, are built on market projections that are calculated using past trends – they tend to skew innovation decisions toward optimizing existing product lines rather than pursuing new ones [1].

While organisations' innovation activities tend to have higher risk profiles than other pursuits and require different methods for measuring value, the constant need for innovation, change and renewal are business imperatives that cannot be ignored or avoided by any organisation for any sustained period. In fact, the risks associated with an organisation not making changes to products, internal processes or business models over time are equally significant, leading to extinction and irrelevance if unchecked. As a result, promising ideas are often smothered. And while many of the innovation initiatives that do gain approval are low risk, they offer only low returns – incremental improvements that usually do little more than maintain market share.

We see organizations apply three key principles to their work to get a better balance of risk and innovation:

Flexibility. Rather than placing all their bets on one or two experiments, companies may want to consider building a portfolio of early innovation investments that act as options. Monsanto – number ten on the Forbes list of the world's 100 most innovative companies – realized early on that genetic modifications could become very important to its seed business. To mitigate risks, Monsanto developed a portfolio of experiments, first investing in biotechnology companies, then opening its Life Science Research Center which ultimately came to house more than a thousand employees. In a 2012 presentation to investors, Monsanto's Chief Technology Officer Robb Fraley described this approach as – growth layers for the company's R&D pipeline [3].

Advanced analytics and other sophisticated risk management tools can guide such complicated decisions by regularly assessing value against multiple variables and scenarios. This support can include risk methodologies and tools designed to measure both positive and negative uncertainty and provide realistic estimates of results. Risk scenario analysis can also simulate results and provide better operational flexibility.

Speed. Successful innovation often requires speed. Companies can use rapid experimentation and agile development to increase their chances of filling their innovation portfolios with new products and extensions. An iterative approach that is closely linked to customers and markets can draw attention to risks and integrate them into decision-making. In a

high-speed environment, effective risk management often encourages risk-taking within the bounds of a company's risk appetite. Risk management can, and should, facilitate companywide dialogue to determine which risks are acceptable, which aren't, and how much risk is appropriate based on potential returns.

Control. Venture capital firms use controls, but these controls typically are designed to increase risk tolerance, fostering a culture that embraces the logic of intelligent mistakes. Innovative companies often create a safe ground for experiments, – safe because risks are controlled, managed and measured. This typically entails bringing together the finance and operating sides of the business. To the finance side, risk is often something to avoid or mitigate, while operations often sees risk as inherent and necessary for growth. Effective risk governance can bridge these two viewpoints, translating strategic challenges into specific risks to take and providing rules, parameters and measurements to guide both the investments and the process.

Many of the companies we talk to are focused on growth strategies and their associated risks. Programs designed to accelerate innovation are becoming more common, in part, because successful innovation can be a cure for many of the risks companies face. The new and higher regard for risk management reflects its potential to provide controls in complex business environments.

Risk management can, in fact, add a level of discipline and transparency to the innovation process, while supporting desired risk culture and appetite. Marrying risk management and innovation can boost innovation efforts by creating confidence that innovation bets are well-placed and that innovation risks are well-managed [6].

Throughout GHD's history of over 80 years, a healthy level of innovation has consistently operated in the organisation even without a dedicated innovation or research and development (R&D) department. Acting with the support and encouragement of managers, staff have typically engaged in innovation relevant to the business ranging from R&D partnerships with universities and cooperative research centres, through to developing new services, tools and software in response to client needs and project challenges. Having experienced considerable growth in the past decade and recognising that globalisation, competition and rapid technological changes were changing the face of professional services, it became clear GHD needed to adopt a more structured approach to generating and delivering innovation. The business issues included: duplication of effort; lack of transparency; unclear targets and determination of what represented value to the business; inconsistent capturing of effort and outcomes, and insufficient communication of success and sharing of learning throughout the firm. GHD needed to more closely align innovation with business strategy and tighten the management of risk, ensuring that returns were commensurate with the investment required. In response, GHD's innovation program known as Innovations', led by a dedicated team, was

launched in March 2008 after two years of research, design and piloting. The program is underpinned by an online platform where all employees are encouraged to submit, collaborate on and vote on ideas. The program encourages the contribution of three types of ideas: internal ideas for improving business processes and systems; external ideas relating to clients, the communities we work in and revenue-generating opportunities, and strategic ideas, enabling staff to contribute to the future direction of the company. All ideas are judged by an independent management board, the Innovation Advisory Group (IAG), in accordance with a transparent selection framework. After passing through two investment gate reviews in the ideas pipeline, the best ideas receive seed funding to enable refinement and testing, with the goal of delivery or commercialisation by the Innovations team. Benefits of innovation are:

Improved productivity & reduced costs. A lot of process innovation is about reducing unit costs. This might be achieved by improving the production capacity and/or flexibility of the business – to enable it to exploit economies of scale.

Better quality. By definition, better quality products and services are more likely to meet customer needs. Assuming that they are effectively marketed, that should result in higher sales and profits.

Building a product range. A business with a single product or limited product range would almost certainly benefit from innovation. A broader product range provides an opportunity for higher sales and profits and also reduces the risk for shareholders.

To handle legal and environmental issues. Innovation might enable the business to reduce its carbon emissions, produce less waste or perhaps comply with changing product legislation. Changes in laws often force business to innovate when they might not otherwise do so.

More added value. Effective innovation is a great way to establish a unique selling proposition ("USP") for a product – something which the customer is prepared to pay more for and which helps a business differentiate itself from competitors.

Improved staff retention, motivation and easier recruitment. Not an obvious benefit, but often significant. Potential good quality recruits are often drawn to a business with a reputation for innovation. Innovative businesses have a reputation for being inspiring places in which to work [6].

A strategy of investing in innovation can bring significant rewards, but it is not without risk. Amongst the potential pitfalls are:

Competition. An innovation only confers a competitive advantage if competitors are not able to replicate it in their own businesses. Whilst patents provide some legal protection, the reality is that many innovative products and processes are hard to protect. One danger is that one research-driven, innovative company makes the initial investment and takes all the risk – only to find it is competing with many me-too competitors riding on the coat-tails of the innovation.

Uncertain commercial returns. Much research is speculative and there is no guarantee of future revenues and profits. The longer the development timescale the greater the risk that research is overtaken by competitors too.

Availability of finance. Like other business activities, R&D has to compete for scarce cash. Given the risks involved, R&D demands a high required rate of return. That means that for businesses that have limited cash resources, the opportunity cost of investing in R&D can be very high.

Risk management isn't the antithesis of innovation; it's the essence. How an organization conceives of risk management will in large part determine how effectively innovation is pursued. As with the first four answers to my hypothetical question above, many people see risk management as largely preventative or as the opposite of the bold risk-taking that breakthrough innovation is assumed to entail. In this view, risk management is the guy in the green eyeshade whose job is to stand behind the visionary with his head in the clouds and keep his feet on the ground—and sometimes hold those feet to the fire [7].

But risk management and innovation aren't opposed. As Clark G. Gilbert and Matthew J. Eyring recently argued in *Harvard Business Review*, the core competency of the most effective and successful innovators is risk management. For these innovators, whether in new ventures or in a corporate setting, the ability to identify, prioritize, and systematically eliminate risks is what drives innovation forward. They approach risk management not as a safety procedure but as a learning process. They know that no new-business model is perfect from its inception. So they test its various components and their combinations such as its customer value proposition, profit formula, key resources, and key processes – in controlled experiments in tightly circumscribed markets, learning as they go and making adjustments.

Risk management, treated as a learning process, not only propels innovation forward but can also speed it up. For example, Hilti, a maker of handheld power tools that was seeing its premium products undercut by lower-priced tools, innovated a new business model in which the company would lease and manage "fleets" of tools for contractors who found tool management a bigger headache than tool costs. The model would require on Hilti's part an entirely new set of skills like contract management, customer relationship management, fleet Management; and require an entirely new way of working with clients. All of these challenges represented significant risks for success.

To manage those risks, the company tested an early form of the business model on only eight customers in its home market of Switzerland. During this early period, they were able to experiment with various accounting metrics, contract parameters, and service models – testing and refining the assumptions in their new value proposition. They had believed, for example, that only large construction firms would be interested in the leasing option, but they quickly

learned that small and midsize firms had reasons of their own for finding it attractive. By conducting many small experiments in this limited foothold market, from which it learned valuable lessons and made important early course corrections, the company was able to take the new model from its pilot stage to rollout in all of its markets worldwide in only three years. As Hilti understands, the right kind of risk management isn't just built for comfort; it's also built for speed.

Real discipline in innovation risk management means a more relaxed approach to the financials. In genuinely new-business innovation projects, it is critical to release the leaders of the effort from the norms and metrics of the core business. While experimentation speeds the time to a viable business innovation, it does not necessarily lead immediately to the kind of large-scale growth or increased market share that are usually the barometers of performance in the core business. When new-business innovation fails within a few years to generate major growth or market-share gains, one of two things often happens. Either the effort is abandoned prematurely or more money is thrown at it to push it forward. In the first instance, a more patient company often comes along and succeeds with a similar value proposition. In the second, we often see "zombie" innovation projects that limp along, continuing to suck good money after bad [5].

It is more prudent and ultimately more productive to first get the value proposition right and to judge it in terms of how fast it converts assumptions to certain knowledge. The relevant financial measure during this stage is whether the new business can be made profitable in its foothold market. Profitability confirms the strength of your fundamentals, allowing you the patience to scale up in a measured way. That is the real financial discipline in innovation risk management: the unswerving ability to resist applying the wrong kind of financial metrics at the wrong time and so unwittingly choke off growth potential before it can reach full fruition.

Taken together, these three principles suggest that one of the biggest risks in innovation is to see risk management as a framework to be superimposed on new-business creation rather than as an inseparable part of the process itself. Since March 2008, over 1,400 ideas have been submitted and more than 30 ideas have received funding for further development. Just as importantly, over 4,500 collaborations have been contributed by GHD people, enhancing the firm's ability to leverage intellectual capital across geographic boundaries and 75 different technical disciplines. Internal ideas that are progressing to implementation have the potential to save GHD approximately \$750,000 per annum [2].

Many ideas relate to the automation of processes which can deliver significant time and cost savings. Not surprisingly, the challenges posed by climate change have driven many of the external ideas. One project in the pipeline is a concept that could cut the energy consumption of a widely-used water treatment technology by at least 50 per cent. Based on

modelling conducted on a large Australian water treatment plant, annual energy savings to the client could be close to one million kilowatt hours per year, translating to about \$150,000 in energy costs and 1,040 tonnes of CO₂ (which would require 6,240 trees to offset). A provisional patent has been filed and proof of concept testing is scheduled for the first half of 2010. What is particularly interesting about this new invention is that it was submitted by a young mechanical engineer, validating the open approach to innovation employed within the company whereby anyone, regardless of seniority and position, is able to contribute.

After passing through two investment stage gates and a rigorous validation process, development funding was allocated and a team assembled, comprising commercial and technical specialists with the requisite skills to advance the concept. The market application for this technology is global with significant potential for financial and environmental benefits. Without a structured program in place with the dedicated skills of commercialisation staff, the organisation's exposure to risk includes these possible scenarios.

A potentially lucrative project would not have taken place due to the inventor's lack of seniority and an undeveloped network of influence within the organisation in order to secure executive championship.

A project may have proceeded through the sheer determination of a passionate inventor, but without the input and stewardship of commercialisation staff with the skills and experience to take forward new opportunities, the chances of successful commercialisation would have been significantly decreased. GHD has mitigated its exposure to these two risks by building a range of features into its program including:

- a tool for submitting and collaborating on innovative ideas that is accessible and visible to all staff;
- a democratic, transparent decision process for evaluating ideas, removing the potential for line managers to block good ideas;
- a team trained in change management and commercialisation that is dedicated to championing and driving innovation projects through to implementation [4].

For most companies, the big, breakthrough innovations that deliver new benefits to customers and thus create new markets – the sort of innovation exhibited by Dell when it pioneered the direct distribution model for PCs, or by Apple with its iconic iPad – remain elusive indeed. So what do the innovation masters do differently? Our research shows that highly innovative companies are essentially no more likely to embrace risk than their less innovative peers. But when we investigated further, we found that they approach the management of innovation risk differently – and that their business models are critical factors in their success. Consider, for example, the business model employed by the

venture capital industry, which finances most startups. These players know that most early-stage experiments will founder – but they also know that the fruits of just one or two such experiments could earn back the investment of their entire portfolio (and then some).

So venture capitalists take an active approach to managing the risks of their investment portfolios, systematically measuring those risks to generate returns. They engage dynamically with their portfolio companies. Rather than killing a project that's running into difficulties, they try alternative solutions. But they also move swiftly and decisively to close failures, while doubling down on ideas with promise – and encouraging ongoing experimentation.

Big companies are obviously different. Larger, slower and subject to the constraints inherent in managing their core businesses successfully, they can't act exactly like startup investors. But they can afford to modify their stage-gate processes to drive more effective innovation. And they do have much to learn from the venture capital industry's bold yet disciplined approach to innovation risk management – an approach that has created such groundbreakers as Amazon.com and Facebook. Leading players recognize that far from stymieing innovation, sophisticated, state-of-the-art risk management tools, techniques and models, including small-scale experimentation and portfolio management, can actually help encourage it. They know that by fusing such a risk management approach with innovation, they can create a powerful, value-driving partnership. They focus their innovation risk management efforts on three key business areas [1].

With product lifecycles across industries shortening, successful innovation often hinges on speed. And that, in turn, requires a risk management process that can shorten learning cycles, recognize failures early and make timely course corrections – a process that facilitates a companywide dialogue around which risks are acceptable and how much risk is appropriate, based on potential returns.

At Corning, for example, the company's R&D, engineering, manufacturing and commercial expertise are all harnessed in support of the innovation process, from earliest ideation right through to commercialization. What's more, senior management participates throughout, facilitating swift decision making and significantly reducing the time it takes to launch projects.

With risks well managed, companies can then use rapid experimentation and the techniques of agile development – an iterative process closely linked to customers and markets – to boost their chances of coming up with a truly profitable innovation portfolio.

That's what California-based Salesforce.com did when management decided to jettison the traditional stage-gate innovation process in favor of agile development. In fact, since the enterprise software maven began working iteratively with the market through frequent testing, its innovation prowess has started to return to the high-octane levels of the company's early years.

Globalization and innovation are transforming the way we live. The pace of change and increasingly interconnected nature of our societies makes predictions even more hazardous than in the past. Future developments are unlikely to reflect a continuation of past trends. The only certainty about where the world is headed is that it will be full of surprises. Innovation in products, services and processes will yield extraordinary benefits for humanity, not least in the areas of health and medicine. Negative shocks are also likely, with the future characterized by increased systemic risk, and a higher likelihood of potentially destabilizing and even catastrophic events. The integration of the global economy has been associated with increased access to ideas which allow for the transformation of both economic and social systems, as well as access to the products, goods and services which enable improvements in livelihoods. Recent decades have been associated with the most rapid decline in poverty in history and remarkable improvements in health outcomes for billions of people [8].

Not everyone is benefitting equally from these concurrent trends of innovation and globalization: globalization is uneven, and as many as 1,5 billion people have not accessed the improvements that globalized innovation affords¹. Within almost all societies, inequality in access and outcomes is growing, as those able to benefit from change accelerate ahead of those locked into increasingly outmoded systems. A more interconnected, mobile and educated world yields many positive benefits. However, it also places a greater premium on remaining up to date and reinvesting in health, education, infrastructure and other determinants of economic and social outcomes. The more rapid the innovation, the greater is the requirement for investment and agility in order to stay abreast. For particular individuals or communities, such as the elderly, who do not have the necessary capabilities to remain current, the pace of change may provide a threat to at least their relative place in society. In the first section of this chapter, we consider a number of the drivers of technological innovation and identify a sample of the major trends currently transforming the global landscape, including globalization, rising levels of education, and economic and demographic change.

As our world becomes increasingly interconnected and complex, new dangers also emerge: we become increasingly vulnerable to systemic risks. To reap the benefits of our interconnected and innovative world, we must address and mitigate these risks. This will be the subject of the second part of this chapter. 1.1

Technological change Elderly people today have seen revolutionary technological change during their lifetime. Yesterday's science fiction is today's reality. In 1980, we barely understood genes, now we can manipulate them.

In 1990, a mobile phone was the size of a brick, now the nanotechnology industry is creating electronics that float on air and that you could not see without a microscope. Twenty years ago, there were fewer than 3 million people with internet access; now there are nearly 2,5 billion. Genetic modification can give rabbits an eerie green luminescence. Robots make cars. Guns can be manufactured with a 3-D printer. Technology is a double-edged sword. It unleashes new potential and has been central to human progress. It can level the playing field, helping the emerging economies of the world to catch up more swiftly, and continues to lift more and more people out of poverty. However, technological change also can wreak havoc, as exemplified in the unchecked growth of derivatives, which Warren Buffet called 'weapons of mass destruction' in the financial sector [3].

Conclusions

The fundamental reason for the decline of innovative activity in Ukraine is the low solvency able demand for innovation, resulting in almost 80% of financing innovation in the industry at the expense of own funds. This innovation funding for its own account non-ferrous metallurgy is 100%, woodworking and pulp and paper industry – 97,4%, printing industry – 97,2%, ferrous metallurgy – 95,3%, the medical industry – 93,5 %, engineering and metal working – 88,9% of total funding.

Most companies today have come to recognize that sophisticated risk management is a key enabler of long-term growth and profitability. What's more, some companies have put in place advanced capabilities to manage their innovation risks successfully. Few, however, have developed the agile, iterative approach that can drive breakthrough innovation rather than drowning it – or have created the risk-tolerant, organization-wide governance structures that allow such capabilities to flourish. But growing numbers realize that with such systems in place, they could be confident that their innovation risks were transparent and well managed. And they, too, could start creating dynamic portfolios of innovative ideas and experiments – and commit the funds to bring the best of them to market.

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