ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ МИНИСТРЛІГІ

Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ
КӨЛІК – ЭНЕРГЕТИКА ФАКУЛЬТЕТІ

«КӨЛІК ЖӘНЕ ЭНЕРГЕТИКАНЫҢ ӨЗЕКТІ МӘСЕЛЕЛЕРІ: ИННОВАЦИЯЛЫҚ ШЕШУ ТӘСІЛДЕРІ» XI ХАЛЫҚАРАЛЫҚ ҒЫЛЫМИ-ТӘЖІРИБЕЛІК КОНФЕРЕНЦИЯСЫНЫҢ БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ XI МЕЖДУНАРОДНОЙ НАУЧНО – ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ: «АКТУАЛЬНЫЕ ПРОБЛЕМЫ ТРАНСПОРТА И ЭНЕРГЕТИКИ: ПУТИ ИХ ИННОВАЦИОННОГО РЕШЕНИЯ»

PROCEEDINGS OF THE XI INTERNATIONAL SCIENTIFIC-PRACTICE CONFERENCE «ACTUAL PROBLEMS OF TRANSPORT AND ENERGY: THE WAYS OF ITS INNOVATIVE SOLUTIONS»

Астана, 2023

УДК 656+620.9
ББК 39+31
А43

А43 Актуальные проблемы транспорта и энергетики: пути их инновационного решения: XI Международная научно – практическая конференция, г. Астана, 16 марта 2023/Подгот. Ж.Д. Курмангалиева, У.Ш. Кокаев, Т.Т. Султанов – Астана, 2023. – 709с.

ISBN 978-601-337-844-2

В сборник включены материалы XI Международной научно – практической конференции на тему: «Актуальные проблемы транспорта и энергетики: пути их инновационного решения», проходившей в г. Астана 16 марта 2023 года.

Тематика статей и докладов участников конференции посвящена актуальным вопросам организации перевозок, движения и эксплуатации транспорта, стандартизации, метрологии и сертификации, транспорту, транспортной техники и технологии, теплоэнергетики и электроэнергетики.

Материалы конференции дают отражение научной деятельности ведущих ученых дальнего и ближнего зарубежья, Республики Казахстан и могут быть полезными для докторантов, магистрантов и студентов.

ISBN 978-601-337-844-2
9 786013 378442

УДК 378.1

INNOVATION AND ECONOMIC GROWTH

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Innovation is often a technological change that outperforms a previous practice. To lead or sustain with innovations, managers need to concentrate heavily on the innovation network, which requires deep understanding of the complexity of innovation. Collaboration is an important source of innovation. Innovations are increasingly brought to the market by networks of organizations, selected according to their comparative advantages, and operating in a coordinated manner.

When a technology goes through a major transformation phase and yields a successful innovation, it becomes a great learning experience, not only for the parent industry but other industries as well. Big innovations are generally the outcome of intra- and interdisciplinary networking among technological sectors, along with combination of implicit and explicit knowledge. Networking is required, but network integration is the key to success for complex innovation. Social economic zones, technology corridors, free trade agreements, and technology clusters are some of the ways to encourage organizational networking and cross-functional innovations.

After the collapse of the Soviet Union, all its depending states and countries found themselves in a dire state of bankruptcy. The oh so well-planned economy on command virtually ceased to exist overnight, also due to the collapse of the entire supply- and distribution chain.

Fortunately for Kazakhstan, the natural resources like oil, gas rare earth, gold, uranium, and other highly valuable commodities now belonged to the citizens of the country. Thanks to an excellent governmental management, administrations started to function rapidly and after 2 years of poverty and starvation the country began to function for the very first time under its national rulers and with the support of the entire citizenship of Kazakhstan.

Planned Market Economy had failed, and Kazakhstan embraced the benefits of Capitalism and the Free Market Economy.

This process of change occurred very quickly since the country did not have to “re-invent the wheel” but could adopt strategies for economic and financial growth simply by adopting the ways and means of “Best practice” European countries.

Innovation technologies and foremost the management of innovations can be compared with the Continuous Improvement Process (CIP), well known amongst all manufacturing entities as well as with service providers in general.

As CIP implies, it is a continuous development process that probably once started with the invention of a technical, mechanical, electrical, or electronical item and over time was improved until a stage where it had to be re-engineered thus innovated.

Still, the legacy of technical achievements and the abandoned production facilities of the former Soviet Union did not leave much to be re-engineered but to be levelled and replaced in its entirety.

Travel back in time, or the Need for Innovation

Sumgait, Azerbaijan 2003, one of the 25 most polluted places on earth

And it would be a mistake to assume that these “memorials of the past” do not exist in many post-Soviet countries anymore.

Oops, a mistake, wrong picture?

Sumgait, AZ: Children playing in toxic waste

Space Technology in Soviet times, and what was left

Rocket factory – and what was left of it

Space shuttle factory

Baikonur… not so long ago

I did not include these pictures to shock you but to make it unmistakingly clear that after the collapse of the Soviet Union, innovation, first had to be substituted by reconstruction at entirely new building sites with new buildings, machinery, other modern, technical equipment and most of all, with professionals with the adequate education and experise to comply with modern-day demands.

That could not be achieved immediately by introducing innovation technologies because there was no basis and no political entity left that would permit such endeavor. This also resulted in the

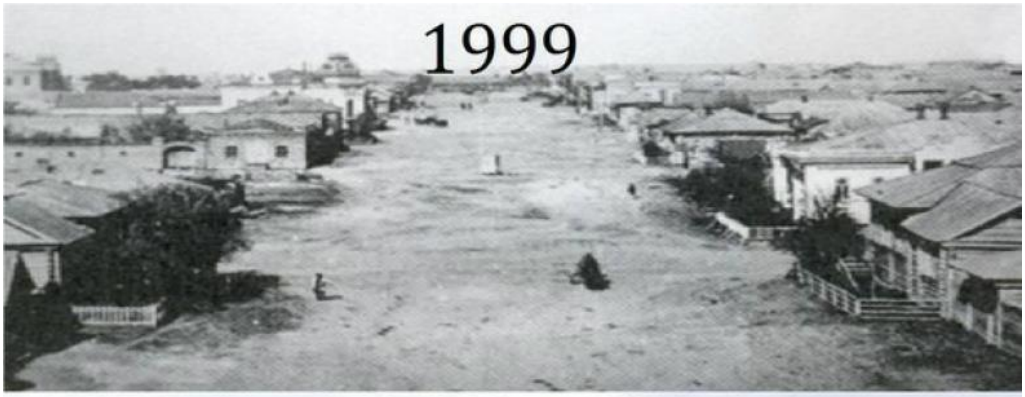
failed communist system of the former SU, that begun in 1918 after the October Revolution and ended in total collapse 1991.

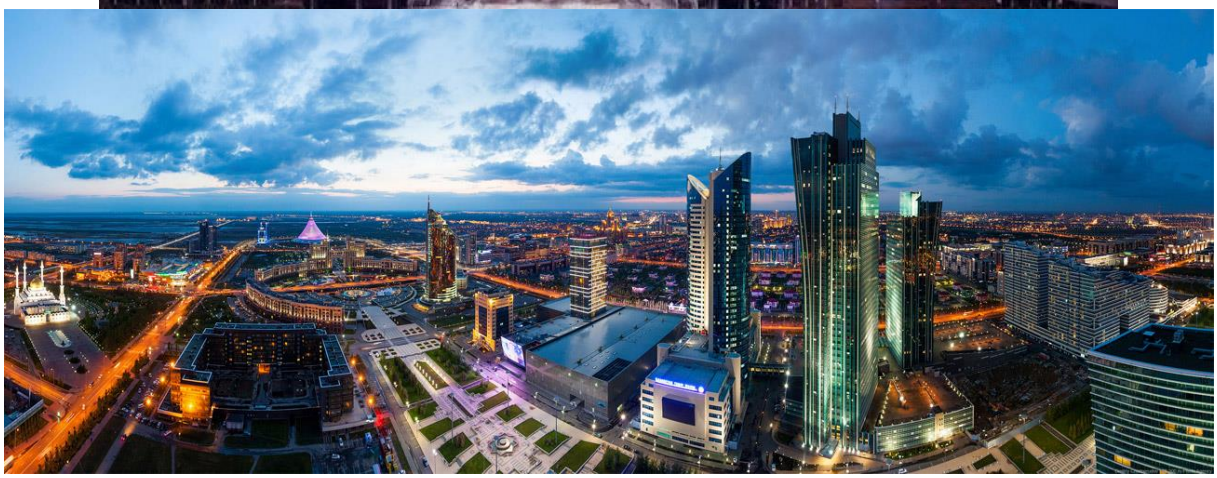
Therefore, in the first years after achieving independence, Kazakhstan had to take a different approach to New Technologies and innovations:

1. Purchase of state of the art equipment.
2. Hiring of foreign experts.
3. Import of all kind of goods to satisfy the needs of the people.
4. Export of oil and gas to finance the imports.

Obviously, this kind of approach can only be a short-term solution since most of the GDP does not stay in the country. However, in order to bring rapid improvement to the suffering nation, Kazakhstan did the only feasible thing:

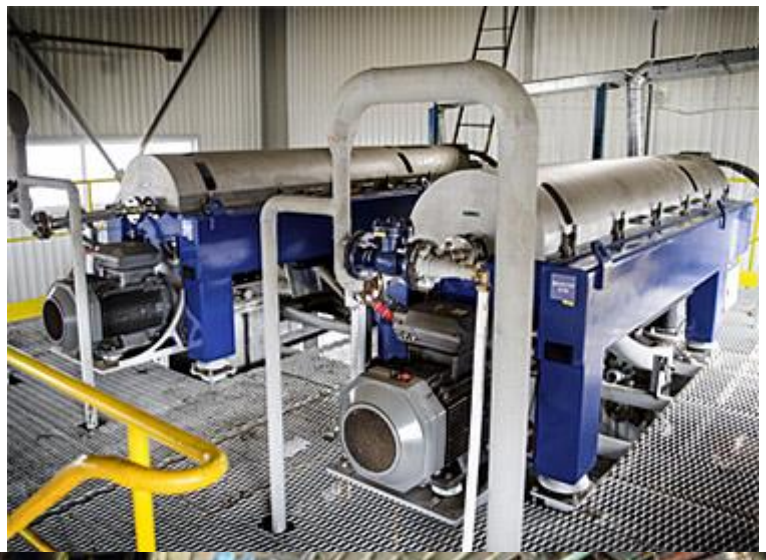
Thanks to the revenues from the sales of oil and gas, the government spent the money for fast but mostly sustainable solutions.





20 years after independence. This is Nur-Sultan today!

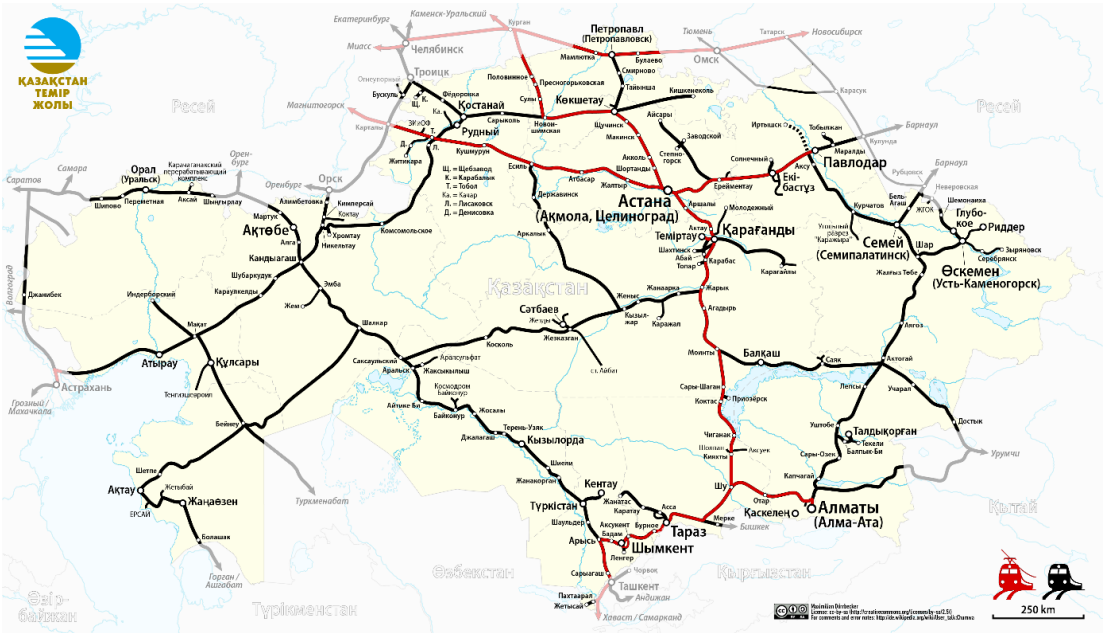
And these are Kazakhstan’s new and modern industries.



PV-solar plant

Kazatomprom

Train manufacturing plant (ALSTOM), Nur-Sultan



Train grid for Kazakhstan

Looking at these achievements, even a layman can tell that the industrial revolution of less than 30 years could not be achieved only by nationally created innovation. Latest since Expo 2017, the government has steered its vast investments in a different direction. Instead of buying products, the country now purchases the necessary Know-How and newest technologies, called **Technology Transfer**, thus, to enable Kazakh manufacturers to produce and distribute state of the art products themselves.

What to do after a technology transfer?

Technology transfer, typically is instigated by a client wanting to improve his or her presently applied techniques and technologies to:

- Become more competitive.
- Increase his/her market share.
- Expand the range of products and/or services.
- Conquer new markets.

However, in order to apply the often expensively purchased new technology, one must thoroughly understand said technology. Just by buying a new technology it is far from granted that the purchaser will apply this technology successfully.

This means: Adopting a New Technology does not mean to copy it one on one, but it requires a deep technical and commercial understanding of how and where to apply this technology successfully.

Real life examples:

When a reputable car manufacturer presents a new (car) model, the first buyers will NOT be the customers but the competitors. They will dissect the car into its smallest parts to learn on what the competitor did, how and why.

Still, that would NOT enable a competitor to adopt what he sees and learns and to build an exact copy, it's not only technical details but also with in-depth Know-How, reliability, image – and most of all, R & D and required experience in design and manufacturing.

Example 1 Fiat – Zastava (former Yugoslavia).

Example 2 BMW – URAL motorcycle engines.

Example 3 Fiat – Lada.

What does Management of Innovation mean?

A management innovation can be defined as a marked departure from traditional management principles, processes, and practices or a departure from customary organizational forms that significantly alters the way the work of management is performed.

Put simply, management innovation changes how managers do what they do. And what do managers do? Typically, managerial work includes:

- Setting goals and laying out plans.
- Motivating and aligning effort.
- Coordinating and controlling activities.
- Accumulating and allocating resources.
- Acquiring and applying knowledge.
- Building and nurturing relationships.
- Identifying and developing talent.
- Understanding and balancing the demands of outside constituencies.

In a big organization, the only way to change how managers work is to reinvent the processes that govern that work. Management processes such as strategic planning, capital budgeting, project management, hiring and promotion, employee assessment, executive development, internal communications, and knowledge management are the gears that turn management principles into everyday practices. They establish the recipes and rituals that govern the work of managers. While operational innovation focuses on a company's business processes (procurement, logistics, customer support, and so on), management innovation targets a company's management processes.

The Why, What and How of Management of Innovation within an organizational culture

Are you a management innovator? Have you discovered entirely new ways to organize, lead, coordinate, or motivate? Is your company a management pioneer? Has it invented novel approaches to management that are the envy of its competitors?

Does it matter? It sure does. Innovation in management principles and processes can create long-lasting advantage and produce dramatic shifts in competitive position. Over the past 100 years, management innovation, more than any other kind of innovation, has allowed companies to cross new performance thresholds. Yet strangely enough, few companies have a well-honed process for continuous management innovation. Most businesses have a formal methodology for product innovation, and many have R&D groups that explore the frontiers of science. Virtually every organization on the planet has in recent years worked systematically to reinvent its business processes for the sake of speed and efficiency. How odd, then, that so few companies apply a similar degree of diligence to the kind of innovation that matters most: management innovation.

Why is management innovation so vital? What makes it different from other kinds of innovation? How can you and your company become blue-ribbon management innovators? Let's start with the why.

Why Management Innovation Matters. General Electric.DuPont.Procter & Gamble.Visa. Linux, Google, Amazon. What makes them stand out? Great products? Yes. Great people? Sure. Great leaders?Usually. But if you dig deeper, you will find another, more fundamental reason for their success: **management innovation.**

In the early 1900s, **General Electric** perfected Thomas Edison's most notable invention, the industrial research laboratory. GE brought management discipline to the chaotic process of scientific discovery and, over the next 50 years, won more patents than any other company in America. Much of GE's current competitive prowess can be traced to that extraordinary accomplishment.

DuPont played a pioneering role in the development of capital-budgeting techniques when it initiated the use of return-on-investment (ROI) calculations in 1903. A few years later, the company also developed a standardized way of comparing the performance of its numerous product departments. These innovations, among others, helped DuPont become one of America's industrial giants.

Procter & Gamble's preeminence in the packaged goods industry has its roots in the early 1930s, when the company began to formalize its approach to brand management. In the decades since, P&G has steadily built upon its early success in creating value out of intangible assets. P&G's product portfolio includes 16 brands that have produced $1 billion-plus in sales every year.

Visa, the world's first near-virtual company, owes its success to organizational innovation. When Visa's founder banks formed a consortium in the United States in the early 1970s, they laid the

groundwork for one of the world's most ubiquitous brands. Today, Visa is a global financial web that links more than 21,000 financial institutions and more than 1.3 billion cardholders.

Linux, the computer operating system, is the best-known example of a recent management innovation: open-source development. Based on other innovations like the general public license and online collaboration tools, open-source development has proved to be a highly effective mechanism for eliciting and coordinating the efforts of geographically dispersed individuals.

As these examples show, a management breakthrough can deliver a potent advantage to the innovating company and produce a seismic shift in industry leadership. Technology and product innovation, by comparison, tend to deliver small-caliber advantages.

A management innovation creates long-lasting advantage when it meets one or more of three conditions: The innovation is based on a novel principle that challenges management orthodoxy; it is systemic, encompassing a range of processes and methods; and it is part of an ongoing program of invention, where progress compounds over time. Three brief cases illustrate the ways in which management innovation can create enduring success.

Harnessing employee intellect at Toyota. Why has it taken America's automobile manufacturers so long to narrow their efficiency gap with Toyota?

In large part, because it took Detroit more than 20 years to ferret out the radical management principle at the heart of Toyota's capacity for relentless improvement. Unlike its Western rivals, Toyota has long believed that first-line employees can be more than cogs in a soulless manufacturing machine; they can be problem solvers, innovators, and change agents.

While American companies relied on staff experts to come up with process improvements, Toyota gave every employee the skills, the tools, and the permission to solve problems as they arose and to head off new problems before they occurred. The result: Year after year, Toyota has been able to get more out of its people than its competitors have been able to get out of theirs.

Such is the power of management orthodoxy that it was only after American carmakers had exhausted every other explanation for Toyota's success—an undervalued yen, a docile workforce, Japanese culture, superior automation—that they were finally able to admit that Toyota's real advantage was its ability to harness the intellect of "ordinary" employees. As this example illustrates, management orthodoxies are often so deeply ingrained in executive thinking that they are nearly invisible and are so devoutly held that they are practically unassailable. The more unconventional the principle underlying a management innovation, the longer it will take competitors to respond. In some cases, the head-scratching can go on for decades.

Building a community at Whole Foods Co. It's tough for rivals to replicate advantages based on a web of individual innovations spanning many management processes and practices. That's one reason why no competitor has matched the performance of Whole Foods Market, which has grown during the past 25 years to 161 stores and $3.8 billion in annual sales. While other grocery chains have been slashing costs to fend off Wal-Mart, Whole Foods has been rapidly evolving an extraordinary retail model—one that already delivers the highest profits per square foot in the industry. What may not be obvious to health-conscious consumers and growth-loving investors is that the company's management model is just as distinctive as its high-margin business model.

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