

Highlights of the Report

Main Highlights

1. Today's accelerated technological progress makes the role of industry for achieving sustainable economic and social development and for fighting poverty and marginalization even more important. Industry is the main source, user and diffuser of technology. It fosters technological dynamism and productivity growth. It is vital for the creation of new more qualified jobs, and it is often the hub for diffusing new technological and organizational knowledge to other activities. For developing countries, it is a powerful engine of economic growth and structural transformation, and a driving force in achieving sustainable industrial development.
2. In the fast-changing global industrial scene, where competition is constantly taking new forms, with new products, processes and services, countries must be internationally competitive to survive and grow. Only a few developing countries have succeeded in doing so—others, a disturbingly large number, have not.
3. The UNIDO Industrial Development Scoreboard reveals wide dispersion in country levels of industrial performances and pronounced differences in structural factors. Industrial activity and capabilities are highly concentrated in a few leading economies, both industrialized and developing, where this concentration is declining in the former and increasing in the latter.
4. Most developing countries continue to languish at the bottom of the technology ladder with no perceptible rise in using new technology for the benefits of industrialization. The least developed among developing economies, are technologically, extremely weak and vulnerable.
5. The key challenge facing developing countries today is how to meet intense global competitive pressures while avoiding the “low road” of reducing wages, devaluing exchange rates, and disregarding labor or environment regulations, each incompatible with sustained growth. Instead, industrial competitiveness requires building capabilities in the use of new technologies—the high road. It stretches well beyond the front-line enterprises that face international rivals to encompass other enterprises, government, and the public and private institutions that provide vital services to industry.
6. Building industrial capabilities is a long, costly and risky learning process, which many developing countries cannot afford to accomplish entirely on their own. It depends on enterprise abilities to accelerate the acquisition of new technologies, upgrade them over time and ultimately create new technologies—in other words, to innovate and learn.
7. The emerging global setting opens alternatives for developing economies to build industrial capabilities through linking up with foreign partners to acquire new technology and to leverage these acquisitions in ways to gain as much as possible from the new relationships. For successful leveraging, learning is required to use and adapt the product and process technologies they acquire.
8. Participation in global value chains can accelerate the process of innovation and learning by enterprises. Along this fast track road in acquiring production capabilities, different constraints for further development can appear, but for latecomers the challenge is to confront this. By engaging in collective efforts in innovation and learning, countries can use the links effectively to gain knowledge and to learn.
9. For developing countries, major challenges of innovating and learning within global value chains are to choose particular value chains, to access the leading players in them, and to engage in collective efforts to use those relationships to acquire right technology and knowledge and to learn.

10. Pursuing an innovation and learning strategy takes more than just opening up to world market forces and linking with foreign partners. It requires building domestic industrial capabilities through setting the basic macroeconomic and social imperatives in place. It also requires establishing a nurturing environment, rich with supporting institutions that assist firms in building their industrial capabilities. And, it requires engaging in purposive and directed effort to capture the externalities by collective learning.
 11. The high road to competitiveness can be reached only through a concerted innovation and learning strategy for industrial restructuring and upgrading—for moving from simple to more advanced technologies—developed and implemented by the government and private sector working together in partnership. At the core of this strategy is a national vision of the path to be followed, one premised on an exercise of foresight for both internal and external factors.
 12. Building industrial capabilities needs extensive policy support. Countries that employed industrial policy in export-oriented environments—with complementary policies to build skills, technological capabilities and supporting institutions and to leverage foreign resources—show that such strategies can radically transform the industrial landscape in less than a generation.
 13. Developing countries have the primary responsibility for ensuring conditions conducive to innovation and learning. But the international community also has a clear responsibility. It has to assist countries in addressing the growing structural gaps—and to ensure that they are not denied the dynamics of industrial development.
 14. The international community must articulate a vision and formulate a strategy to narrow the widening gap in industrial capabilities between nations. That vision must be supported by financial and other resources—and by appropriate changes to the rules of economic life. Aid donors, development bodies, corporations, institutions and rule-makers must all be involved.
- Technical progress has integrated the world economy much more closely than ever before, linking product, service, financial and information markets.
 - Knowledge, information, technology, capital and skilled labor are becoming increasingly available, creating opportunities for latecomer firms, industries and countries to draw upon an existing stock of knowledge and advanced technologies avoiding lengthy and costly learning processes.
 - The global setting has facilitated the creation and spread of integrated global production systems and networks, governed by transnational corporations—making it even more difficult to isolate countries and enterprises from world market forces.
 - Transnational corporations increasingly separate production processes into small pieces and locate them around the world to take advantage of differences in production factor costs, managing those sites as a coherent whole for their competitive advantage.
 - Competition is constantly taking new forms. Low costs are important—but so are innovation, flexibility, reliability, service and quality. New products, processes and services are becoming the main drivers of competitiveness.
 - Enterprises are increasingly exposed to global competition with an immediacy and intensity rarely seen before. The needs of competitiveness stretch well beyond the front-line enterprises that face international rivals, encompassing other enterprises, organizations and institutions and governance—and this applies to developing and industrialized countries alike.
 - How well countries and enterprises cope with the challenges of present global setting depends on their adaptive capabilities to upgrade technology to increase competitiveness. Technological upgrading can be achieved by pursuing a strategy of linking with domestic or foreign partners to effectively leverage new technology and knowledge for industrial development—the process is in many ways similar to real innovation in industrialized countries.
 - Using new technologies efficiently, to competitive standards, requires learning new skills, organizational techniques and marketing and supply chain methods.
 - The content, risk, cost and duration of the innovation and learning effort vary by technology, industry, enterprise and country context.

Highlights by Chapter

Chapter 1: Globalization in focus

- The globalization of industry is irreversible, driven by trade and investment liberalization, accelerated technological progress, new organizational and management systems, and new global rules and regulations.

Chapter 2: Featuring today's map of global industrial activity

- There have been big variations in industrial performance, evident in both developed and developing countries, due to the changes in the global industrial activity.
- Manufacturing activity remains heavily concentrated in industrialized countries, though developing countries are increasing their share. In intensity of industrialization, developing countries still lag far behind.
- East Asia (including China) is the best industrial performer in most respects, though it lags slightly in manufacturing value added per capita. It has the highest growth rates in manufacturing production and exports. It is far more export oriented than other developing regions. It has a more technologically advanced structure and is rapidly improving all the main structural drivers of industrial performance. And East Asia (excluding China) has a commanding lead in skill creation, research and development (R&D) and technology licensing.
- Latin America and the Caribbean leads developing regions in manufacturing value added per capita and foreign direct investment. It has strong skills, an established export base and good infrastructure for information and communication technologies, and it leverages foreign technology effectively. But its manufacturing production and exports are based on a weak technological structure, particularly if Mexico is excluded. The region lags well behind East Asia in domestic technology effort. Even Mexico, the outlier in technology upgrading because of the North American Free Trade Agreement (NAFTA), suffers from a weak R&D base.
- South Asia has attained decent manufacturing growth but performs poorly in production per capita and exports. Its export structure is weak and stagnant. It lags in skills creation, domestic technological effort and physical infrastructure—and is relatively isolated from inflows of technology. The region's two largest economies, India and Pakistan, have not attracted much FDI to producing for export markets.
- The Middle East, North Africa, and Turkey taken together, have achieved fair manufacturing value added per capita, a reasonable base of skills and infrastructure, and good access to foreign technology. But its industrial and export structures are not geared to technology upgrading, and its domestic technological effort is weak.
- Sub-Saharan Africa, excluding South Africa, lags behind all other regions in almost all respects. The technological

structure of its industrial production and exports is regressing.

Chapter 3: Benchmarking industrial performance by the CIP index

- The UNIDO Industrial Development Scoreboard focuses on benchmarking 87 countries in terms of their national ability to produce manufactures competitively and in terms of structural factors affecting their industrial capabilities. It includes industrialized, developing and transition economies and covers two years, 1985 and 1998.
- The competitive industrial performance index (CIP) to benchmark industrial performances of economies is constructed from four basic indicators of industrial performance including manufacturing value added per capita; manufacturing exports per capita; share of medium- and high-tech activities in manufacturing value added; and the share of medium- and high-tech products in manufactured exports.
- Ranking economies by the CIP index reveals relative stability of economy rankings over the period, indicating that industrial performance is the outcome of slow and incremental processes. There is a general and expected pattern of industrialized economies congregate near the top, transition and middle-income developing economies around the middle, and low-income developing and least developed economies at the bottom.
- Looking at the regional averages for developing economies, East Asia leads the CIP ranking in 1998, followed by Latin America and the Caribbean, Middle East, North Africa and Turkey, South Asia and Sub-Saharan Africa.
- There are also notable examples of improvements in industrial performances experienced by middle-income developing economies: China, Costa Rica, Malaysia, Mexico, the Philippines and Thailand.
- Low-income economies have not moved up the technology ladder, remaining at the bottom of the industrial performance scale. The gap between them and other developing economies widened, pointing to a growing industrial divergence within developing economies.
- Among the least developed countries, Bangladesh and Nepal had stable rankings over the period, due to the upgrading of the technological structure of their exports. For most other countries, the picture is less sanguine.

rise in domestic technology effort. Some have managed to attract fair amounts of FDI (as a share of domestic investment), but only a few managed to break into integrated global production systems.

- Malaysia, the Philippines and Singapore—all highly dependent on FDI—have the largest shares of high-tech products in manufactured exports. Most other developing countries continue to have very small shares of high-tech products in their manufactured exports. At the bottom of the scale are developing countries specializing in assembly and testing.
- Relatively few developing countries have managed to combine heavy dependence on FDI with domestic technology effort and have done so relying extensively on industrial policy (Singapore is an example).
- Acquiring new technology through domestic R&D is strategy that is more autonomous and involves large investments in skills. For industrial latecomers it is also a riskier strategy, because it tends to involve extensive use of industrial policy. Republic of Korea and Taiwan Province of China have been most dependent developing economies on R&D, but their reliance on FDI has also increased.
- Acquiring new technology through FDI can take countries a long way without a need for strong local R&D. But countries that succeed with this strategy tend to raise their investments in R&D over time, with transnational corporations shifting some innovative functions to them.

DO THE DRIVERS EXPLAIN PERFORMANCE?

- Technology in the generic sense—domestic technology effort and access to foreign technology through FDI and licensing—has a powerful influence on industrial performance.
- Domestic technological effort is statistically the most important drivers of industrial performance, in both 1985 and 1998 and over time, highlighting the need for domestic technological effort even at low levels of industrial development. When measured by R&D financed by productive enterprises, this is the most consistent and significant of the drivers. But the ability to undertake domestic technological effort clearly depends on the availability of skilled manpower and access to foreign technologies.
- Access to foreign technology through licensing is also statistically significant, but its role appears to be diminishing.

- Access to foreign technology through FDI has grown in significance due to the increasing role of integrated production system and networks, governed by transnational corporations. But FDI inflows account for a small share of global investment and are highly concentrated, particularly for high-technology products and components.
- The significance of skills is also increasing, in line with the conventional wisdom on the importance of human capital and technology for competitive industrial performance.
- Infrastructure remains important over the period but strongly associated with industrial growth and technology upgrading, and more as a permissive than a causal factor.

BALANCE BETWEEN DRIVERS AND PERFORMANCES

- A set of selected structural drivers is strongly associated with industrial performance: regions and countries that do well in their industrial capabilities do well in their performances, but there are several notable exceptions.
- Some economies performed in line with their industrial capabilities. Others outperformed achieving an industrial performance higher than expected, such as Singapore, Taiwan Province of China, Malaysia, Mexico, the Philippines and Thailand. Still, some other economies underperformed achieving industrial performance lower than expected, such as Bahrain, Chile, Hong Kong SAR and Panama.
- Industrialized countries have a balance of performances and associated drivers above the average for the whole sample of countries.
- Most developing economies have a balance of performances and associated drivers below the average of the sample, except the mature Asian Tigers. Some developing countries, such as Malaysia, Mexico, the Philippines and Thailand, have above average performances but below average drivers.
- The overperformers among developing economies, apart from Taiwan Province of China, have undergone rapid export growth and technological upgrading in recent years by plugging into global production systems and networks. Participating in high-tech export activity has enabled many of them to overcome gaps in domestic industrial capabilities.
- Strong performance based on weak drivers raises the question of industrial sustainability and signals a need to expand the base of structural factors. This strategy can

make economies vulnerable to an erosion of competitiveness (due to the rising wages or changing technologies) and can easily lead to a rapid fall-off in performance.

- Achieving lower industrial performance than expected is usually caused by disabling regulatory environment, macroeconomic instability and other fundamental factors.
- Benchmarking industrial performances and drivers of that performance is a natural starting point to provide policymakers with useful information for formulating national strategies and policies. As a useful benchmarking tool, the Scoreboard can facilitate diagnosis of a country's technological capability in broad areas of strengths and weaknesses relative to its neighbors, immediate competitors or potential competitors. Countries with more advanced industry and technology are good benchmarks to which to aspire. Scoreboard can help policymakers identify what technological capabilities to develop, what global value chains to latch onto and what industrial support services to support for innovation and learning. But for formulating country-specific policies, the Scoreboard must be supplemented with deeper qualitative analyses of the policy and regulatory regime, institutions, linkages and other factors.

Chapter 5: Innovation and learning to drive industrial development

- For developing countries, achieving competitiveness in technology-driven world calls for strengthening competitive advantages and building new capabilities. This largely depends on the extent and efficiency of enterprises adaptive capabilities to deploy new production and management technologies, upgrade them over time and ultimately create new technologies—in other words on enterprises' capability to innovate and learn in a broad sense.
- Free inflows of trade, investment and knowledge do not necessarily ensure that that enterprises will learn efficiently. Enterprises in developing countries need to innovate and learn as parts of a system—a network of enterprises, institutions and markets. Innovation and learning systems can differ greatly in their ability to stimulate or retard process of innovation and learning, depending on the quality, density and interaction of their various elements.
- A strong innovation and learning system tends to produce a larger number and diversity of efficient industrial enterprises, while a weak system relatively few.
- A more competitive setting generally results in greater technological effort but there may be legitimate reasons to protect infant industries to help them overcome the initial costs of learning.
- Given market and institutional failures, the efficacy of the innovation and learning system reflects the impact of government policy on its various elements.
- The policy challenge for developing countries is to improve some elements of the systems and more important, to formulate a coherent strategy for industrial and technological development. This has been done efficiently in some East Asian economies and the results have been spectacular.
- Enterprise can accelerate its acquisition of technological capabilities by linking up with other firms or institutions, locally or abroad, through formal or informal ties to obtain information, purchase machinery, acquire bits of new technology, or new knowledge from consultants.
- Tapping into global value chains, especially in knowledge-intensive sectors can be a good means to enter global markets and gain access to new technology and knowledge.
- Strategically it makes a lot of difference what linking choice is made, as entry into different technologies involves different innovation and learning processes, but this is also heavily constrained by enterprise competence and the options available.
- Effective leveraging of external resources from the new relationships with outsiders depends on investing in learning to master process and product technologies, to consciously build the foundation for improving current technologies, and to create new ones.
- Building industrial capabilities through pursuing linking, leveraging and learning starts with an in-depth analysis of key factors of competitiveness, and the various options for linking a developing firm to sources of technology and knowledge.
- Leveraging assumes strategic decisions on the choice of needed technology and on specific means of knowledge acquisition.
- Learning involves the actual process of capability enhancement through learning by doing, learning by interacting, learning by monitoring, and learning by formal training—the choice will depend on the type of linkage and lever-

the national strategy for industrial development. Subsidized provision of industrial services is more justified the more widely shared the specific services turn out to be. Services should not be supplied solely by government but also in public-private partnerships or by private firms and associations—with subsidies, if justified.

- Many developing countries have set up industry support institutions copied from developed countries. But the record shows bad functioning, poor quality, inadequate equipment, poorly motivated and remunerated staff, not being demand driven and with unrealistic objectives, and bad management.
- In the sequencing of the development of institutions and organizations for innovation and learning, the highest priority at the outset should be given to institutions and organizations providing general service to enterprises and then gradually to determine which industrial sectors should be given priority. Certainly, high priority should go to the reform of institutions and organizations that serve, or could be reformed to serve, industries in which the country should readily be able to realize a competitive advantage.
- As a general rule, organizations—whether newly formed or being reformed—should not seek staffing at a level of technical expertise too far in advance of that in the firms to be served. The point is to ensure the capability for effectively serving firms in small, manageable ways before investing large sums to secure technical expertise without knowing that it can be effectively deployed in ways that will increase firm productivity.

Chapter 8: The way forward

- Developing countries can build competitive industrial capabilities in the current global setting, but building these capabilities needs extensive policy support because of pervasive market and institutional failures.
- A natural starting point in formulating national strategies and policies is to benchmark the industrial performance and drivers of that performance by looking at the key structural variables to position country's technological capabilities—to identify what global value chains to latch onto and what services to support for innovation and learning.
- Formulating national strategy cannot be left to detached policymakers alone. Also needed are broad coalitions of public, private, civil and academic players, committed to

and agreeing on a vision that can give direction to their industrial strategy.

- A country's industrial policies have to be couched in the broader developmental perspective of creating wealth and enhancing welfare in accord with the general developmental goal of promoting efficiency throughout the economy—to sustain productivity growth and to ensure that the benefits are distributed equitably.
- Each country has to start with a list of framework imperatives required for dynamic industrial development, when designing the policies best suited to its conditions and aspirations. Political, social and macroeconomic stability are the most fundamental. But equally important are clarity and predictability of the policy environment, with flexible policymaking resulting from the ongoing process of learning by major stakeholders. Being competitive entails greater exposure to and contacts with different markets, openness to technology and information flows, an efficient business environment based on simple and universal rules that are easy to understand and comply with, and good governance.
- Framework conditions are not sufficient to enable sustained industrial capability building and continued industrial development. For resource allocation in accordance with dynamic comparative advantage, a coherently framed strategy, aggressively pursued, is needed.
- Good policy framework is a form of social capital, a web of attitudes and personal or group relationships that allow coherent strategies to be devised and implemented in the national interest.
- Traditional policies must be changed, reoriented to focus squarely on domestic innovation and learning, on the building of industrial capabilities by linking to global markets and leveraging foreign resources.
- The objectives of policy reform must be stated in precise, operational terms, terms sufficient to permit meaningful monitoring of their achievement.
- Governments across the world have to mount strategies to enhance the competitiveness and support the productivity growth of their firms. If economies with the most advanced markets and institutions feel the need to undertake competitiveness strategies, the needs of poor countries, with much weaker markets and institutions, must be correspondingly greater.
- Public efforts require direction, but without vision there can be no focused direction. Nor can the direction be

fixed—it demands constant monitoring and revision, as every success story details. Vision is not only about the broad dimensions of strategy, it is also very importantly about the technologies and industries to be promoted.

- The basis of any industrial strategy is a national vision of industrial development. Vision is needed to coordinate and direct policies because it is possible to adopt a range of different development paths.
- The government has to decide on the broad national objectives—economic and non-economic—that cannot be thrown up by markets. The strategy may be explicit or implicit, but it provides the parameters for making all other allocation decisions.
- Alternatively, policies may be selective, aiming to promote particular activities or clusters to tap dynamic learning possibilities, capture exceptional spillover benefits or attract the most promising global value chain activities. Both approaches are theoretically justifiable in the presence of market failures, and they are entirely complementary. The choice of appropriate instruments depends on the nature of the failures and the capabilities of the government to undertake policies effectively.
- The more selective the policies chosen, the greater the competence, information, objectivity and flexibility required of the bureaucracy. The choice of appropriate measures involves creating the mechanisms to implement policies.
- Implementation may need new institutions (in the public or private sector) to support, interact with and link market agents. In the public sector, the government has to provide the technological public goods needed by industry, such as basic research, extension services, standards and metrology. In the private sector, institutions may include business associations, consortia or large private conglomerates that can overcome deficient markets for capital, skills, information and entrepreneurship.
- The actual industrial policy must be crafted to suit the specific country context and its level of development. It must be systemic, and correspond to the phase of learning.
- Technology foresight exercises are particularly useful as a means to comprehend emerging global trends, enabling both firms and the government to formulate detailed strategies in areas that seem sensible.
- “Foresight exercises” offer a disciplined means for determining targets and the ways to achieve them in the context of formulating industrial development strategies at the national and subnational levels.
- The desired, appropriate level of openness may not entail completely free markets for trade and investment or the removal of all such policies as local content rules and performance requirements, as envisioned in negotiations for trade-related investment measures (TRIMS). Careful analysis is needed of whether existing rules are flexible enough to allow the losers to prolong their grace periods or whether the rules need to be changed.
- A new international agenda on industrial development is required for a new vision of how developed countries and international agencies can best assist industrial development.
- Countries should make collective efforts to build a favorable environment for industrial capability building and the necessary structural actors and institutions. But such local efforts should also be helped from outside.
- There appears to be a vacuum at the international level in strategic thinking on industrial development in the developing countries.
- At the level of international community a vision must also be articulated and a strategy formulated to narrow the widening gap in industrial capabilities between nations. It must be supported by financial and other resources—and by appropriate changes to the rules of economic life. Aid donors, development bodies, corporations, institutions and rule-makers must all be involved.