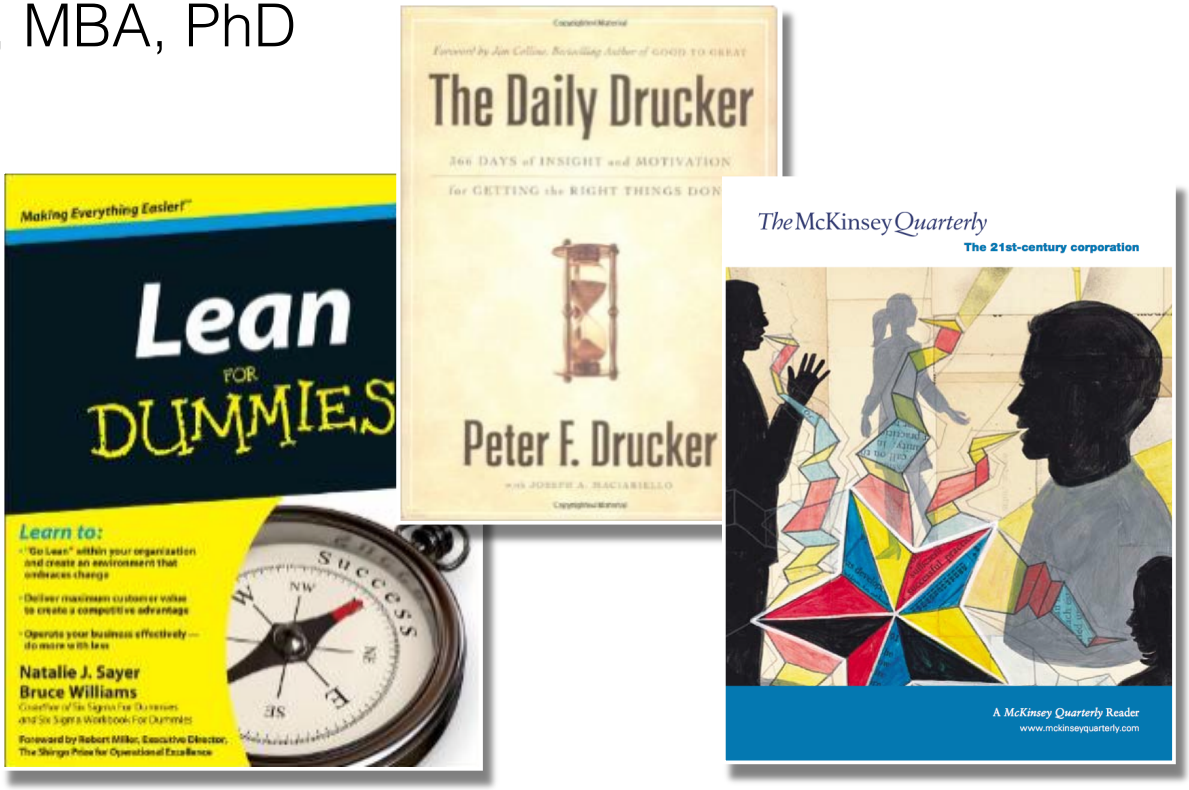
The 21st Century Corporation: Lean, Knowledge Workers, Tacit Work, Informal Networks and what it all means for you*

Alexander Szewczak, MBA, PhD



*you = a modern in vitro pharmacologist

Where do in vitro pharmacologists and compound managers “sit” in biopharma?

- At connection points between stakeholders
- At the transition from custom to automated
- At the intersection between one company and its many vendors

- Vital to the company
- Well positioned to adapt contemporary models to the business of drug discovery

Lean

- Term coined by MIT Sloan MBA student John Krafcik in 1988 to explain the Toyota Production System for manufacturing
- Produce only the value the customer wants, using a minimum of resources
- Inspired by Henry Ford, taken to its ultimate success by Toyota founders and engineers
- A philosophy that highly values workers and smooth operations
- A set of tools, focused on value stream mapping
  - Eliminate the three major types of waste: non-value-adding work, overburden, unevenness (muda, muri, mura)
  - Seven specific wastes: Time, Inventory, Motion, Waiting, Overproduction, Overprocessing, Defects (TIMWOOD)
  - Strive for cycle time = task time.

Knowledge Workers

Peter Drucker ca.1959

- Highly skilled, highly trained, spend most of their time creating, transforming and sharing information
- Work through the application of institutional and personal knowledge — which often needs to be gathered on the fly
- Need to be self-directing and self-motivated to perform effectively (set their own objectives)
- Often know more about the details of what they do than their manager does
- Vital to the success of modern companies

More insight from Drucker

“Most look at outsourcing from the point of view of cutting costs, which I think is a delusion. What outsourcing does is greatly improve the quality of the people who still work for you".

"Information technology forces you to organize your processes more logically. *The computer can handle only things to which the answer is yes or no. It cannot handle maybe.* ***It’s not the computerization that’s important, then; it’s the discipline you have to bring to your processes."***

Types of Work
(McKinsey & Company ca. 2005)

Transformational — Take raw materials and physically transform them into higher value goods

- Limited interactions
- Mining, manufacturing, restaurant food preparation

Transactional — Straightforward interactions and transactions-based work

- Recording a shipment of parts to a warehouse, processing a hotel reservation, airline bookings, auditing, fast-food checkout counter
- Often rule-based, increasingly can be scripted or automated

Tacit — Complex interactions, ambiguous situations, higher level of judgment needed, need to draw on tacit experiential knowledge built up over a long time.

- Managing a supply chain, consulting, diagnostic medicine, biomedical research, designing or troubleshooting complex experiments
- Increasingly networked, collaborative, and important to success or failure of company
- *Important source of durable competitive advantage*

Often jobs mix all three types of work

In Vitro Pharmacologist

- Executing a kinase enzyme activity assay (transformational)
- Processing kinase profiling orders and delivering data report to customer (transactional)
- Designing an optimal kinase profiling panel based on literature and historic results (tacit)
- Developing an assay or new workflow from scratch (tacit)
- Interpreting a complex biological assay and designing the next experiment (tacit)
- Balancing competing demands from program team stakeholders (Chemistry, Disease Area Biology, DMPK, Biomarkers, etc.) (tacit)

Often jobs mix all three types of work

Compound Manager / Automation Engineer

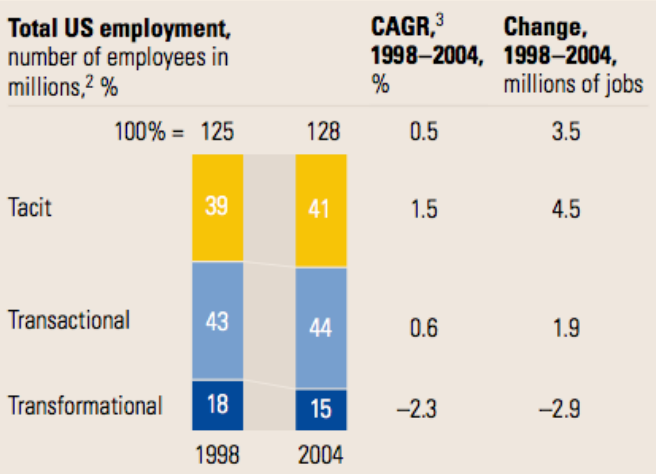
- Dissolving compound (transformational)
- Processing compound orders and delivering samples to customer (transactional)
- Designing an optimal automated compound storage and liquid handler system based on vendor input and personal experience (tacit)
- Developing a new compound workflow from scratch (tacit)
- Balancing competing demands from different customers while designing a next generation integrated system for your company (tacit)

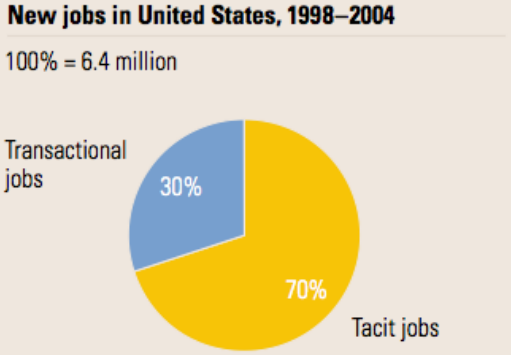
“For the past 30 years, companies have boosted their labor productivity by reengineering, automating, or outsourcing production and clerical jobs.”

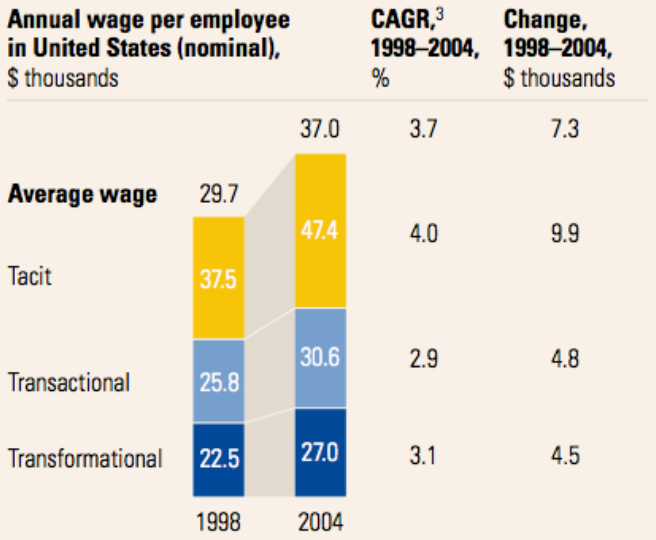
- By definition, transformational and transactional work can be written down as instructions. Automate, streamline, standardize these activities.
- Move as much tacit work as possible into these realms.
- Transactional & transformational excellence can be copied; tacit excellence is much harder to copy.
- Many manufacturing companies have excelled by incorporating tacit work on the production line (e.g. Toyota).
- Focus on remaining tacit work — that is where durable competitive advantage will come from in the 21st Century.

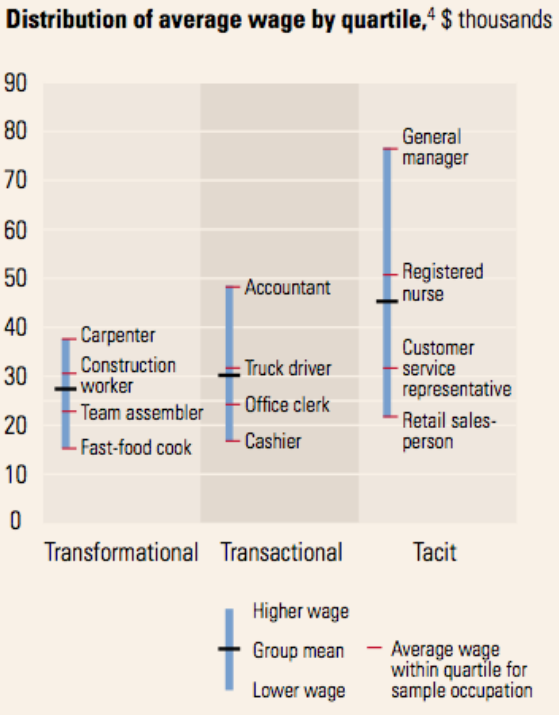
A new kind of worker

US employment and wages by job type[1]



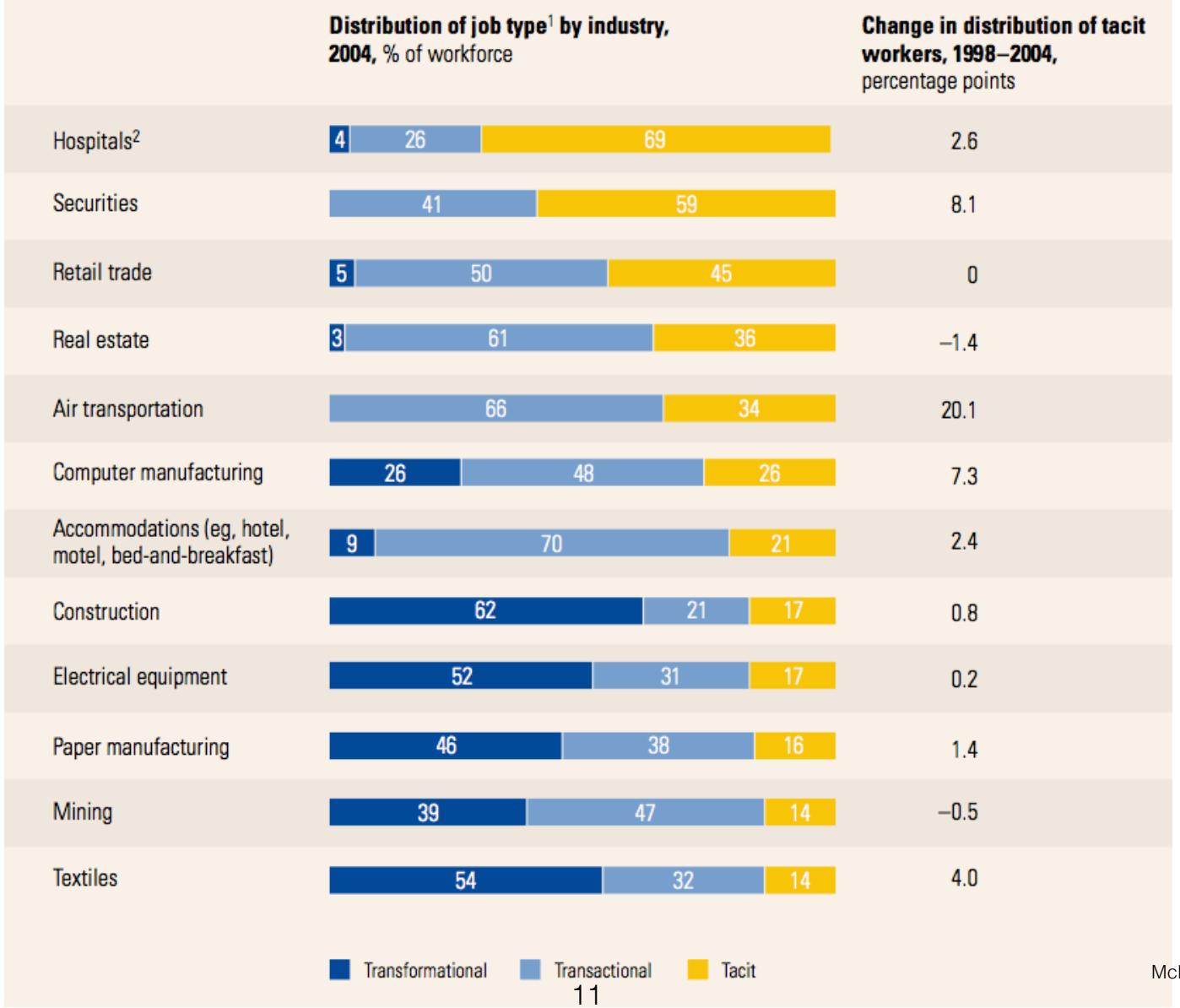




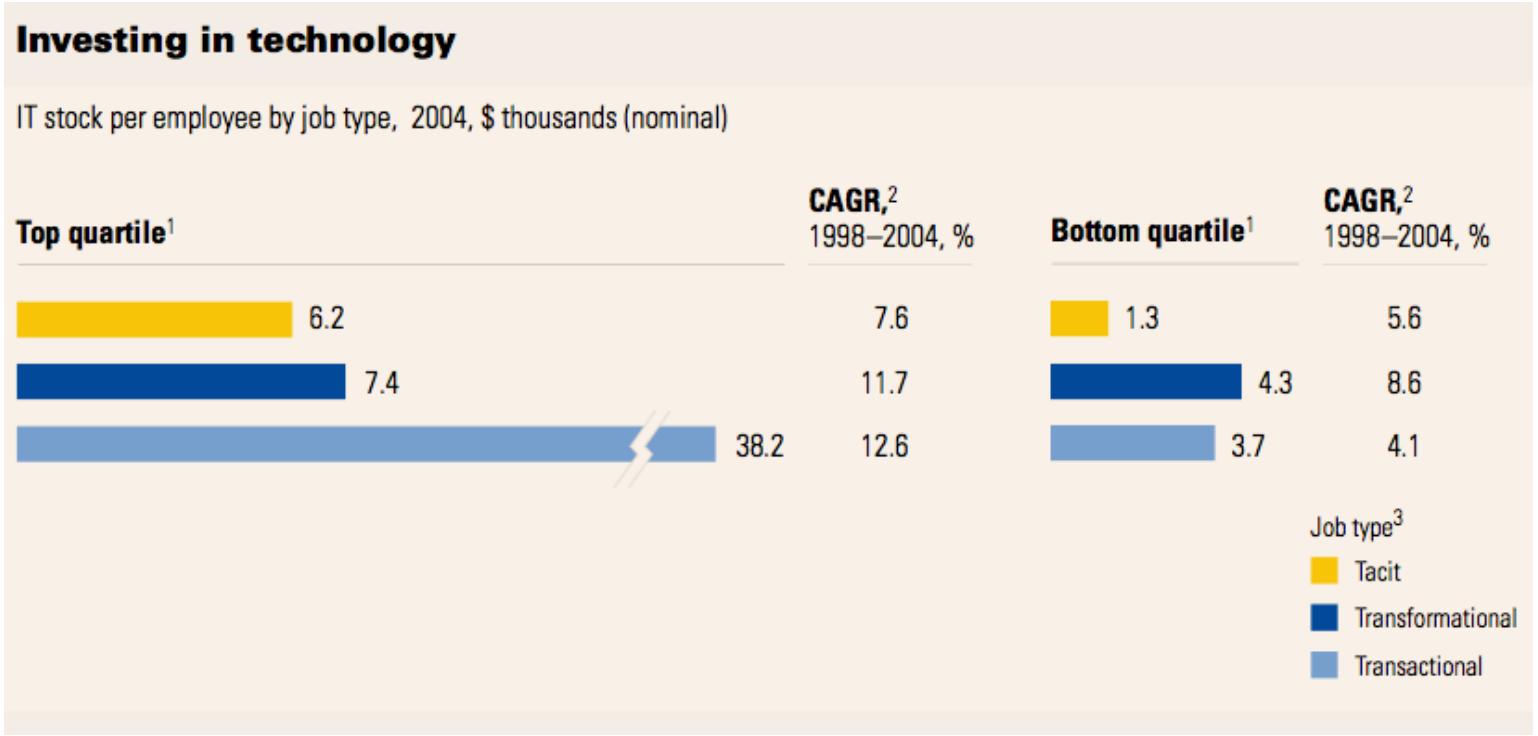


McKinsey & Company

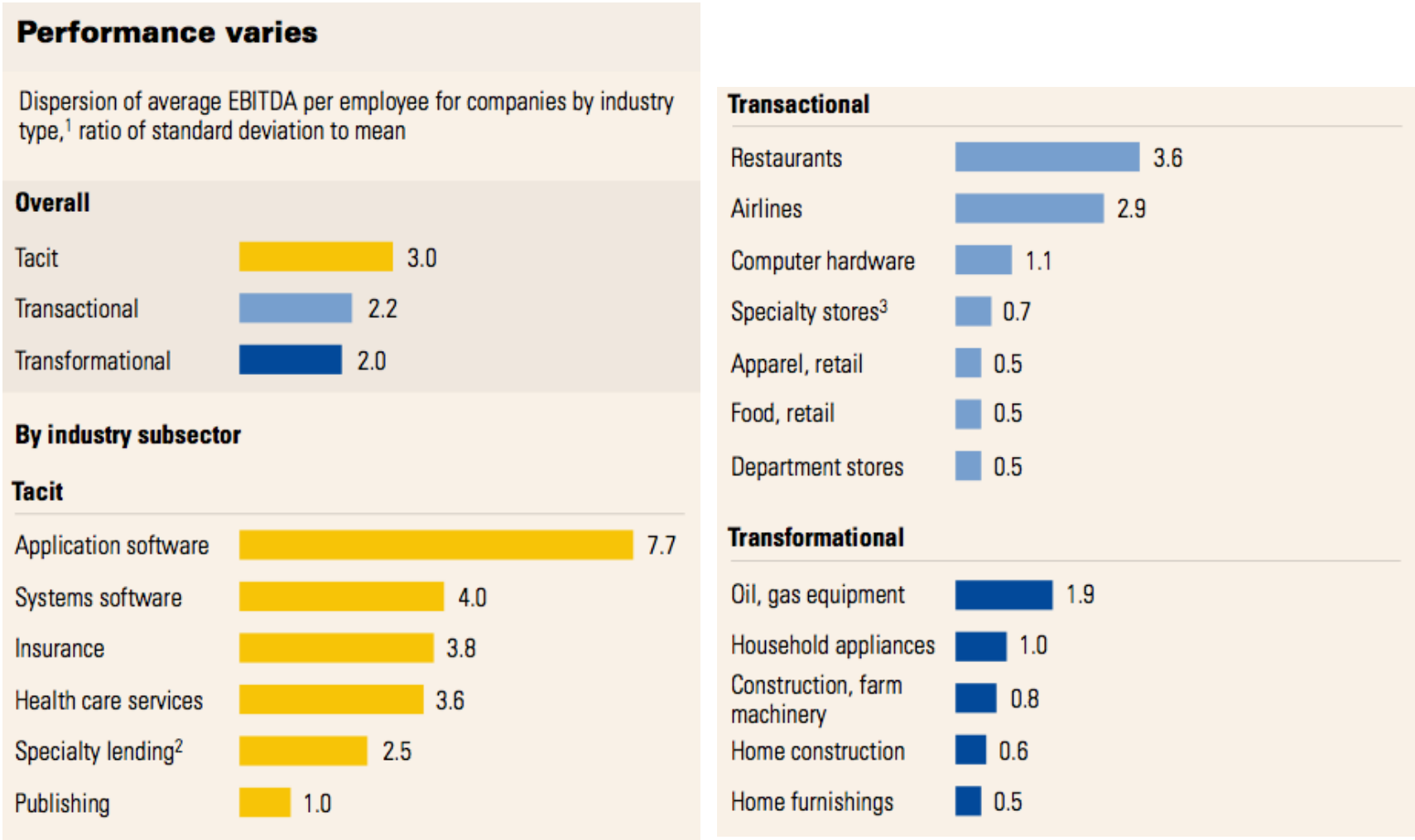
The job mix



McKinsey & Company



There is an opportunity for greater IT investment to boost the productivity of tacit employees



The more tacit the work, the greater the dispersion in returns -- those who manage their tacit work properly have a competitive advantage

"As more 21st-century companies come to specialize in core activities and outsource the rest, they have greater need for workers who can interact with other companies, their customers, and their suppliers."

"*Raising the productivity of employees whose jobs can't be automated is the next great performance challenge—and the stakes are high.*"

"*Companies that get it right will build complex talent- based competitive advantages that competitors won't be able to duplicate easily—if at all.*"

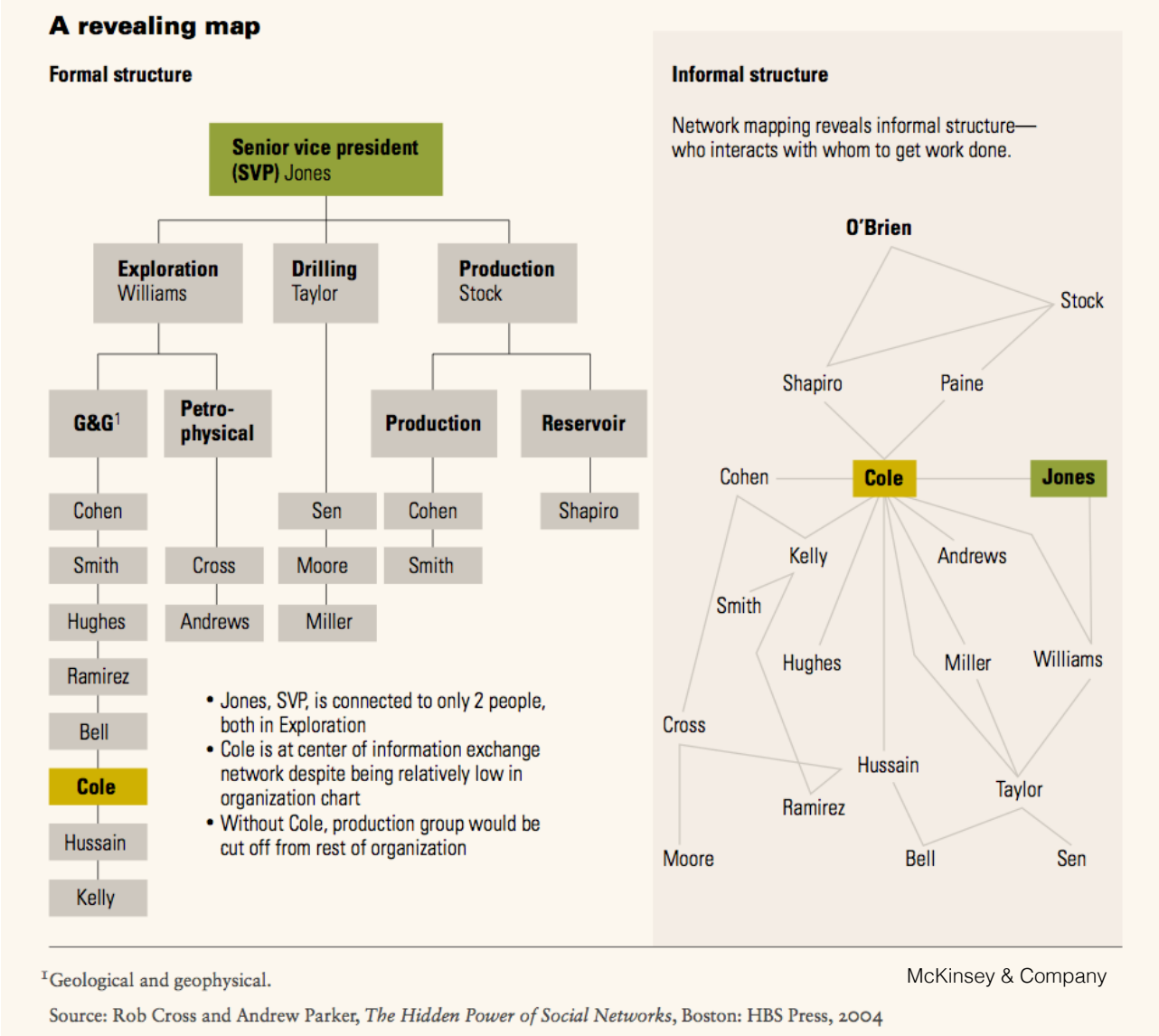
Informal Networks

"As we used surveys and e-mail analysis to map the way employees actually exchange information and knowledge, we concluded that the formal structures of companies, as manifested in their organizational charts, don't explain how most of their real day-to-day work gets done."

Informal networks extend horizontally across complex organizations — and that's where most real work gets done!

Without Cole, the production group would be cut off from the rest of the organization. His boss Jones, the unit's senior vice president, is connected in the informal network to only two people, both in Exploration. This is increasingly typical in today's large, sprawling corporations. Informal networks, slipping through the back channels, cross the lines of geography, products, customer groups, and functions— where the action is— and even through the thick silo walls of vertically oriented organizations.

Informal networks are organized by mutual self interest.



"**It's unfortunate, at a time when the ability to create value increasingly depends on the ideas and intangibles of talented workers, that corporate leaders don't do far more to harness the power of informal networks.** Valuable as they are, these ad hoc communities clearly have shortcomings: they can increase complexity and confusion, and since they typically fly under management's radar, they elude control.

(On the downside, key employees acting as hubs can hobble or even undermine the network if they become overloaded, act as gatekeepers, horde knowledge to gain power, or leave the company.)

The greatest limitation of these ad hoc arrangements is that they can't be managed. They may not be visible to management, and even when they are it's hard for corporations to take full advantage of them. Unintended barriers, corporate politics, and simple neglect can keep natural networks from flourishing. At worst, informal networks can make dysfunctional organizations even more so by adding complexity, muddling roles, or increasing the intensity of corporate politics."

Formal networks

"The specific objective of designing and establishing formal networks is to increase the value and lower the costs of collaboration among professionals. Since formal networks stimulate interactions that the organization sponsors and encourages, they can be managed."

Automated Pharmacology
-- including Compound Management

- Much of what we do is tacit work!
- The goal should be to collaborate as closely as possible with complex teams (through formal and informal networks) in order to provide highly valuable pharmacology data to our customers as efficiently and effectively as possible.
- We are well positioned to understand complex workflows and experiments, and to generate and share information seamlessly through informal and formal network mechanisms.
- We need to transform as much tacit work as possible into the transactional and transformational realms (through automation and/or externalization).
  - Data analysis (Python, R, PipelinePilot, Abase, Spotfire, SQL, etc.)
  - Specialty technologies (flow cytometry and phenotypic analysis, high content imaging, acoustic dispensing, etc.)
  - Assay & workflow automation
  - Externalization of operations where appropriate

All modern biopharmaceutical scientists should leverage themselves with automation and high tech instrumentation to the greatest extent possible.

Free yourself to do tacit work, let the robots and AI systems do the transactional work.

Sources

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