A joint study of the
Swiss-American Chamber of Commerce
and Booz & Company

A Renaissance at Risk

Threats and Opportunities for Swiss Manufacturing

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FOREWORD

Over the past several decades, the center of gravity in manufacturing has migrated to Asia. This happened first with the growth of manufacturing in the Asian Tiger economies of Japan, South Korea, and Taiwan, and more recently and dramatically in China. The pursuit of low-cost manufacturing as well as growing consumer markets in these nations has driven this shift and in all likelihood will continue to foster the development of future global manufacturing powerhouses.

Because of these Asian successes, it has become acceptable (and fashionable) in more developed nations to assume that manufacturing can no longer play a substantial role in the expansion and continued sustainability of their economies. And, though misguided, a popular notion holds that a growing services economy can easily and without penalty replace lost jobs as manufacturing migrates east.

More recently, though, an increasingly vocal chorus of policymakers and business leaders in developed countries are taking an opposing view. They argue that countries without tangible products to sell to their domestic markets as well as those around the world—in other words, countries that dismiss the importance of manufacturing—cannot expect to thrive or compete over the long term.

We share this point of view: Advanced manufacturing and manufacturing breakthroughs are integrally linked to innovation in all aspects of society. When manufacturing declines and innovation fades, a downward spiral ensues in which first-class economies are suddenly playing catch-up in education, technology, talent development, entrepreneurialism, social diversity, and cultural growth.

For the past several years, Booz & Company has been at the forefront of developments and ideas in global manufacturing and its inevitable link to innovation. The work of two Booz & Company partners who wrote *Make or Break: How Manufacturers Can Leap from Decline to Revitalization*, a prescient primer on the future of manufacturing, launched a renewed focus on manufacturing at the organizational level. Booz & Company's multiyear China Manufacturing Competitiveness survey sought to track and measure developments in China, the world's factory, to understand the evolution—or revolution—of manufacturing in China and how it is impacting industries around the world. And our latest work focuses on the state of manufacturing in Switzerland, the country ranked by the World Economic Forum as the world's most competitive economy.

Switzerland, in fact, has a strong manufacturing economy, which serves as a model for how manufacturing can thrive even in the face of high labor costs and attractive employment alternatives for manufacturing talent. Yet, after a recent renaissance in manufacturing, Switzerland too faces challenges from emerging manufacturing nations, forcing policymakers and business leaders to look carefully at measures that will ensure manufacturing's success in the future.

As the largest association of multinationally active companies (large and small, foreign and Swiss) based in Switzerland, the Swiss-American Chamber of Commerce (the Chamber) has an active role in the economic policy discussion regarding the international economy of Switzerland. All too often, policymakers and legislators overlook crucial aspects of this international economy—at 35 percent of GDP, a major piece of the Swiss economy—while focusing too much on the domestic economy. For these reasons, the Chamber feels a duty to highlight the importance of the international economy for the success of the Swiss economy, and also to demonstrate the rapid changes that such companies face in the global economy. And often the Chamber feels bound to warn that, in spite of the great success of recent years, these rapid changes can also have distinctly negative consequences for the well-being of Switzerland.

With this review of Swiss manufacturing, we hope to offer logical and coherent recommendations for what must be done to preserve the strength of manufacturing in Switzerland today, while framing the debate for the challenging steps that will be required to sustain the manufacturing renaissance of recent years. At a minimum, we hope that this study will highlight critical issues and concerns that if not addressed will with high probability usher in a period of Swiss industrial decline.

Ronald Haddock

Martin Naville

"Stability in the operating environment is a foundation for reliable, high-capital-intensity production—Switzerland scores well on this measure."

— Dr. S. Schwan, CEO of F. Hoffmann–La Roche AG

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EXECUTIVE SUMMARY

The Neglected Sector
At 20 percent of Swiss GDP, manufacturing is pivotal in driving wealth and job creation and may be the most important pillar of a diversified Swiss economy. And though it's not generally recognized, manufacturing's contribution to GDP outweighs that of banking by more than five-to-two. Yet in the minds of the public and much of the business community, manufacturing is an afterthought.

The Critical Contribution of Manufacturing
That must change quickly. With the banking sector under severe pressure, Swiss manufacturing needs to contribute even more to GDP than before. Yet although Switzerland witnessed a renaissance in manufacturing activity in recent years, the sector is facing significant challenges: a rapidly changing global economy, new competitors, tight capital, the need for flexibility and nimbleness, and unyielding business environments. Lessons learned from other economies that have already suffered manufacturing declines, such as the U.S. and the U.K., suggest that a failure to anticipate, understand, and respond to these challenges could strip away competitiveness, productivity, and performance.

Hence, Switzerland faces fundamental questions: What can and should be done by the business community, business associations, and the government itself to extend the nation's recent manufacturing gains and set the stage for a promising future? What changes in the Swiss economic, financial, and political systems are required? Who should lead these changes? What are the consequences of inaction?

In a series of interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes, the Swiss-American Chamber of Commerce and Booz & Company found a widespread belief that the country's manufacturing sector could deteriorate markedly unless the business community and government seize the opportunity to sustain manufacturing's central role in the economy, amplify recent growth, and sow the seeds that will create new manufacturing industries for the future.

Manufacturing Renaissance: Will It Be Short-Lived?
The Swiss manufacturing renaissance, which saw value added increase by an average of 6 percent a year between 2003 and 2008 and annual employment rise 1.2 percent during the same period, was in part due to a revitalization of Swiss companies themselves. Domestic manufacturers increasingly specialized in global niche plays at the upper end of the product/price pyramid and were buoyed by global growth. These gains were not the result of any explicit strategic decisions by Swiss policymakers; rather, companies with manufacturing in Switzerland had the right capabilities to serve expanding consumer markets in Asia, Europe, and the United States. There's something to be said for good fortune, but it clearly took thorough preparation by Swiss companies to be in this advantageous position.

But the Swiss manufacturing renaissance would not have occurred had the country's cultural, social, and economic environment been less welcoming to industrial growth. Among the Swiss attributes that drove manufacturing growth are openness to people and foreign investment; quality and flexibility of the Swiss workforce; an emphasis on innovation; and strong cluster and education resources. If these features of Swiss life are lost—and some are endangered—the manufacturing renaissance will fail and the country's economy could be severely harmed.

Threats to Swiss Manufacturing
The Swiss economy has performed relatively well in the current global recession. GDP rose 0.4 percent in the first quarter of 2010, compared to 0.7 percent in the fourth quarter of 2009, which showed a flat line in the euro zone.

"The majority of our revenues come from abroad, yet we continue to innovate and manufacture many products in Switzerland due to the outstanding base of engineering and technical talent here."

— J. Tinggren, president of the Schindler Group

Unemployment remains relatively low at about 4 percent. Yet less than 15 percent of the Swiss executives surveyed by the Swiss-American Chamber of Commerce and Booz & Company are optimistic that the competitiveness of manufacturing in Switzerland will grow during the coming years. The executives are primarily concerned about unprecedented challenges to an industrial system that has provided prosperity for generations. These challenges include global competitiveness; value chain migration; loss of openness; talent pipeline backlash from neighboring countries; and government inaction.

Call to Action

In our interviews, there was clear consensus that the government should become more energetic about supporting the Swiss manufacturing sector. At a bare minimum, the government should do the following:

1. Continue a strong emphasis on high-quality education, emphasizing disciplines that will be needed for critical industries of the future.

2. Remain open to immigration for qualified talent.

3. Retain favorable conditions that support the development of intellectual property and capital resources.

4. Foster and retain economic, political, and social openness.

5. Drive free trade agreements and international linkages.

6. Ensure that Switzerland remains a top destination for the most innovative and creative enterprises.

This list is a good start, but it reflects a desire to keep the government at arm's length and limit its ability to generate real achievements for the nation's future. And that's not acceptable anymore; instead, there must be a discussion within the country of a more activist role that the government can play without encroaching on individualism. Harvard Professor Josh Lerner describes the precise role of governments in promoting entrepreneurial and venture capital activity this way:

"[A] careful balancing act, combining an understanding of the necessity of their catalytic role with an awareness of the limits of their ability to stimulate the entrepreneurial sector.… [Yet], virtually every hub of cutting-edge entrepreneurial activity in the world today had its origins in proactive government intervention. Similarly, the venture capital industry … has been profoundly shaped by government intervention."
— *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It* (Princeton University Press, 2009)

In Switzerland, the development of business clusters could be an optimum role for federal and cantonal governments. This approach is favored by some for two reasons: (1) Emerging competitors from Asia/Pacific are finding substantial success with clusters; and (2) some Swiss industrial sectors have naturally gravitated to clusters in the past, and their growth rates have outpaced those of other, non-cluster sectors.

Our study found that business leaders disagree on who should spearhead a new manufacturing effort. Some said the government has been negligent in charting a vision, while others held that government should stay out of this type of activity altogether because it lacks the competence and mandate to be deeply involved.

However, if Switzerland decides to take a hands-off approach to future manufacturing development, the nation's manufacturing renaissance will end, signaling a slow but steady long-term decline in overall industrial activity. Consequently, some combination of a targeted response to the potential falloff in manufacturing and support for economic growth in new sectors will be required. Hoping for success is no longer a responsible policy choice. Action can either be taken proactively or be forced on the Swiss government and its business leaders before very long. Those, it turns out, are the only real options.

THE NEGLECTED SECTOR

While its role is often downplayed in Switzerland, manufacturing is pivotal in driving the nation's wealth and job creation now and probably will be for decades; it is an important pillar of a diversified Swiss economy. But because it is so critical, manufacturing also represents a significant risk to Switzerland's continuing economic success: There is a strong likelihood that the country's manufacturing sector will deteriorate markedly unless the business community, the government, and educators seize the opportunity to sustain manufacturing's central role, amplify recent growth, and sow the seeds that will create new manufacturing industries for the future.

This notion, provocative in some Swiss quarters and certainly thought-provoking, emerged as perhaps the most intriguing message from a survey and series of interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes conducted by the Swiss-American Chamber of Commerce and Booz & Company.

The overall consensus was that there is a clear need for action in Switzerland to ensure the sustainable growth of manufacturing through an agenda that encompasses specific activities embarked on by the government, educational and research institutions, industry associations, and companies themselves. In other words, no single entity alone can adequately address this issue.

“The niche focus of Swiss companies has been very effective, but it is difficult to build industries of scale with this approach. And scale itself is being redefined by competitors from the emerging markets.”

— T. Büchner, CEO of Sulzer Ltd.

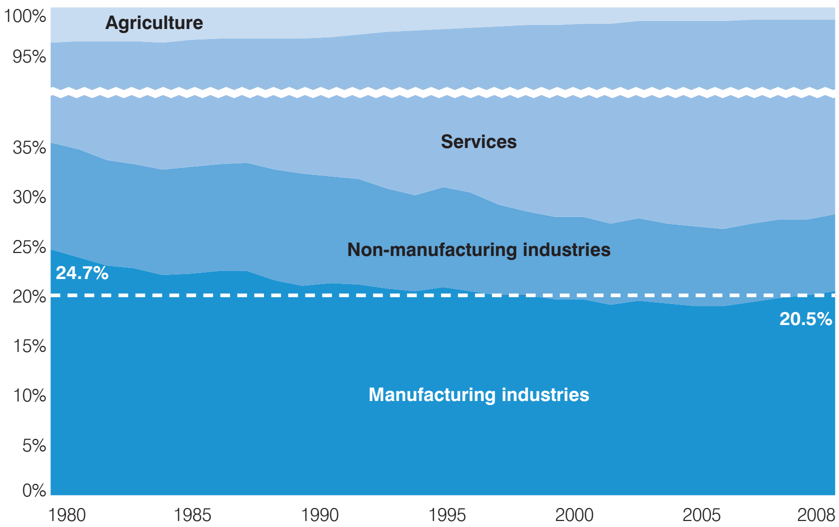
THE CRITICAL CONTRIBUTION OF MANU-FACTURING

The sense of urgency about improving the prospects for manufacturing in Switzerland should not come as a surprise considering the substantial, if somewhat unheralded, role that manufacturing plays in the diversified Swiss economy. Manufacturing contributes about 20 percent of GDP, a level that has been stable for nearly two decades (*see Exhibit 1*).

This places Switzerland on par with, or better than, other major industrial powerhouses in terms of manufacturing's contribution to GDP. In this regard, Switzerland is well ahead of the United States and the United Kingdom and about equal with Japan (*see Exhibit 2*).

Exhibit 1
Sector Contribution to Swiss GDP, 1980-2008

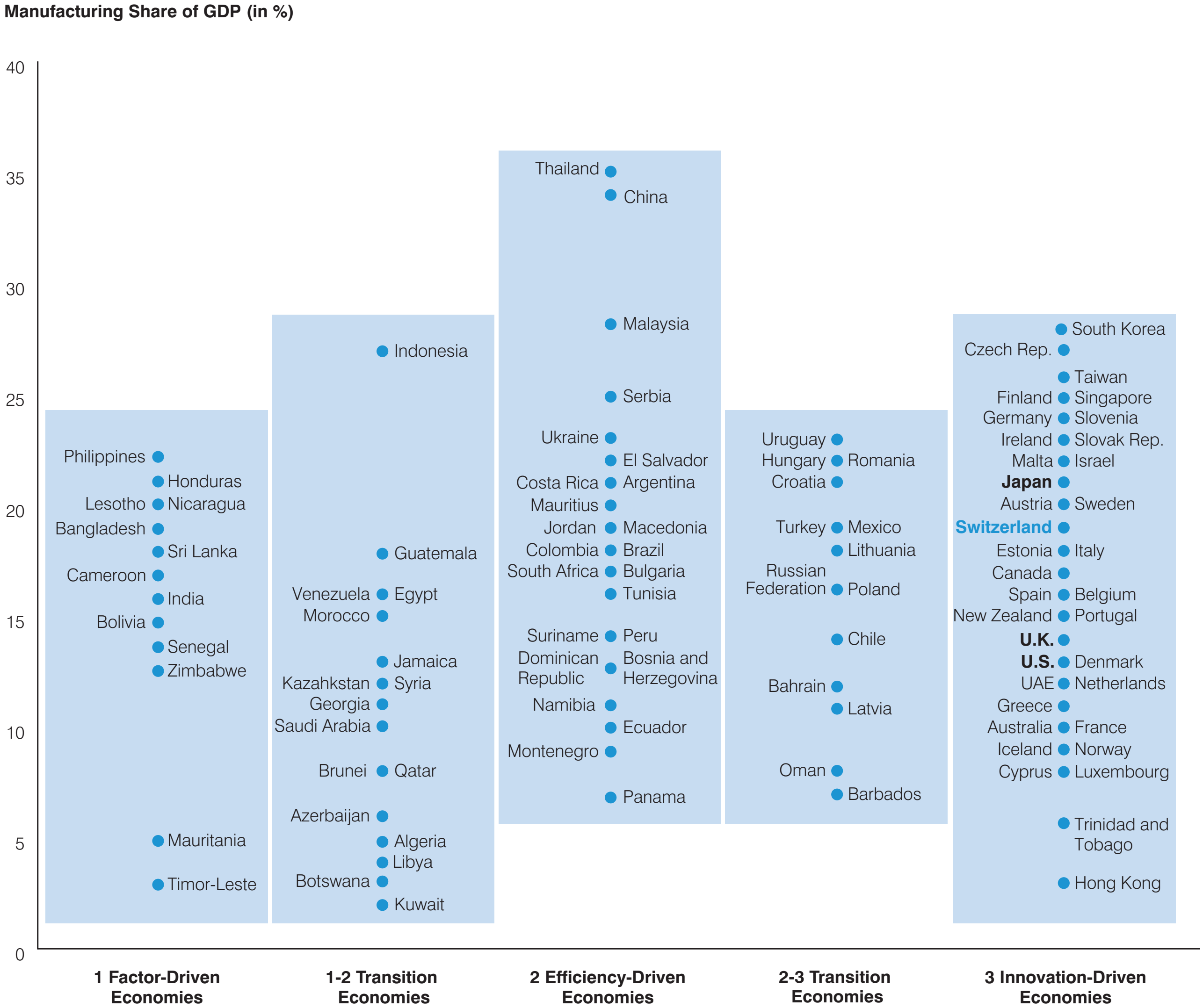
SWISS GDP BY SECTOR (IN %)



Note: Calculations based on sector contributions to GDP without subsidies and taxes on products.
Source: SECO annual aggregates of GDP, production approach

Exhibit 2
Manufacturing Contribution to GDP per WEF Development Stage

MANUFACTURING'S SHARE OF GDP PER WEF DEVELOPMENT STAGE



Note: Excludes countries with more than 20% of GDP contribution of agriculture sector.
Source: World Economic Forum's Global Competitiveness Report; Booz & Company analysis

"We have experienced a renaissance in manufacturing in Switzerland between 2004 and 2008. But the Swiss government cannot take this for granted, as companies in Switzerland are heavily lobbied by many countries around the world. It will require a much greater level of engagement with the business community in the future to develop and deliver a shared vision."

— S. Borgas, CEO of Lonza Ltd.

"The real reason for manufacturing growth in Switzerland itself has been our ability to participate in global economic growth as a result of our strong technical and logistics capabilities."

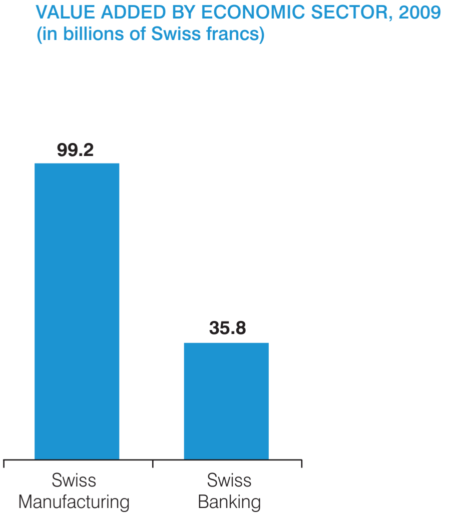
— D. Arnet, CEO of ABB Turbo Systems Ltd.

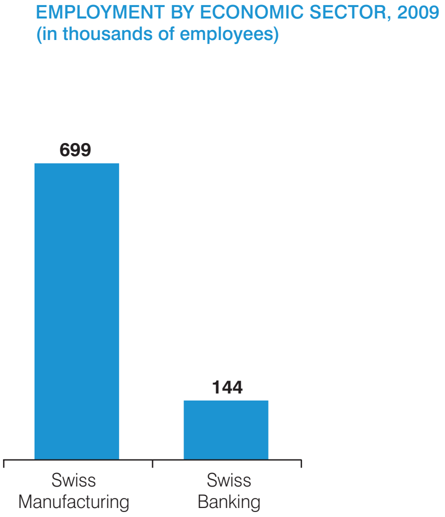
And while financial services are often viewed as Switzerland's greatest economic strength, manufacturing outweighs the banking sector by more than five-to-two in terms of value added and roughly five-to-one in terms of employment (*see Exhibit 3*).

The importance of manufacturing to Switzerland's future is only heightened by the continuing and increasingly endemic weaknesses in financial services. Shifting international rules to cut down on tax evasion and banking secrecy have already resulted in a meaningful decline in assets under management in Switzerland or by Swiss institutions. In fact, this falloff is so severe that it could impact as much as 2 percent of GDP, according to financial services industry observers. Clearly, as was the case in manufacturing during the 1990s, banking and wealth management will need to find a way to innovate new products and services in response to a changing global environment.

Yet, while banking is the center of much involvement by the government itself—although the benefits and consequences of these activities are unknown—manufacturing has received far less attention, despite its greater importance to the Swiss economy.

Exhibit 3
Swiss Manufacturing Compared to Swiss Banking in Terms of Value Added and Employment





Source: SECO annual aggregates of GDP, production approach; Swiss Federal Statistical Office

MANUFACTURING RENAISSANCE: WILL IT BE SHORT-LIVED?

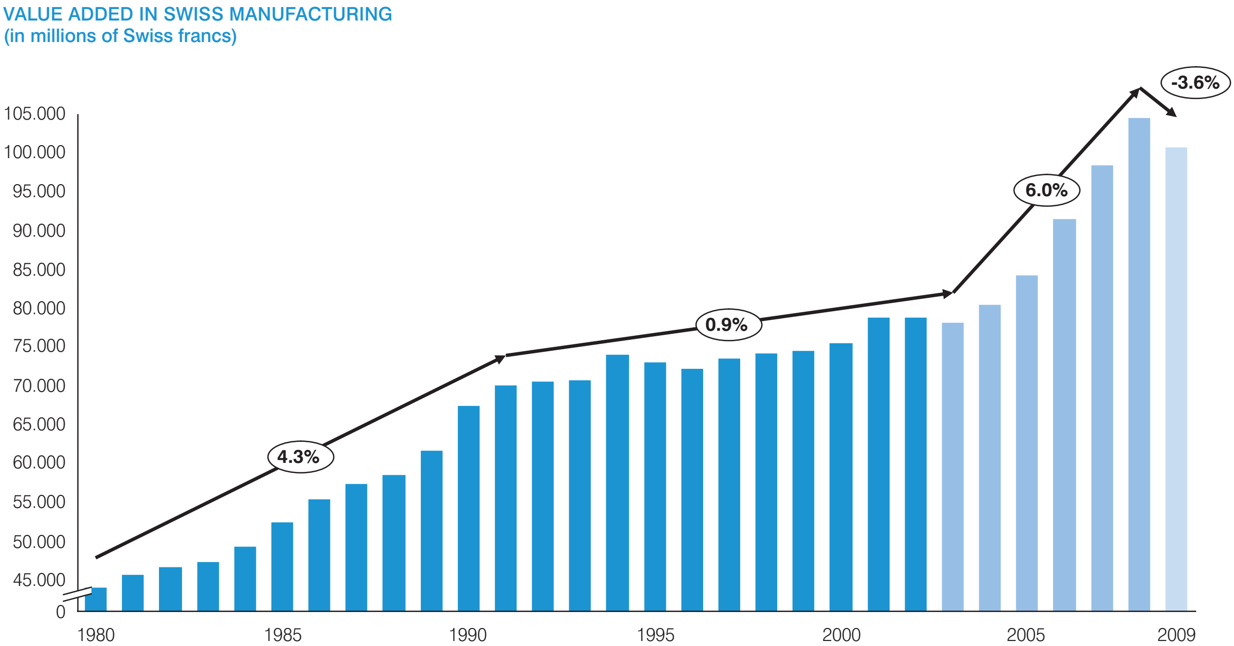
This is an excellent time to consider the future of manufacturing in Switzerland—and take action to ensure that industrial sectors continue to drive the Swiss economy—because the country has recently enjoyed a significant manufacturing renaissance.

Evidence of this renaissance can be found in two critical statistics:

Between 2003 and 2008, value added in Swiss manufacturing rose 6 percent (*see Exhibit 4*) while job creation increased by 1.2 percent (*see Exhibit 5*).

And among the key Swiss industries surpassing the nation's real GDP are some of the most potentially valuable manufacturing sectors (*see Exhibit 6*).

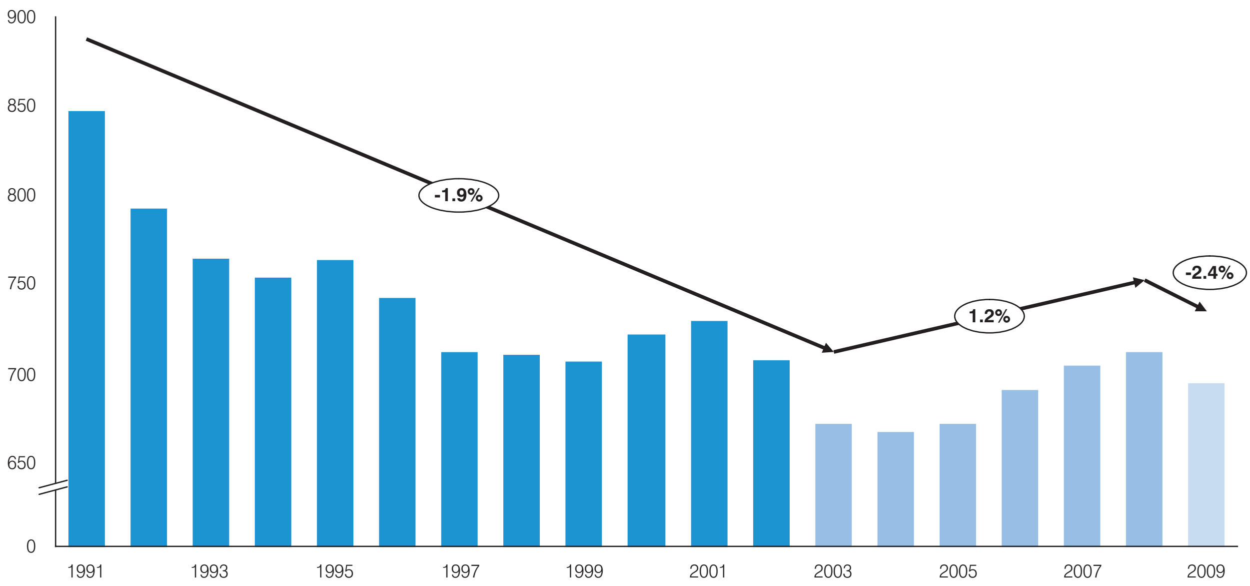
Exhibit 4
Value Added in Swiss Manufacturing Industries, 1980-2009



Source: SECO Annual aggregates of Gross Domestic Product, production approach, at current prices, Booz & Company analysis

Exhibit 5
Employment in Swiss Manufacturing Industries, 1991-2009

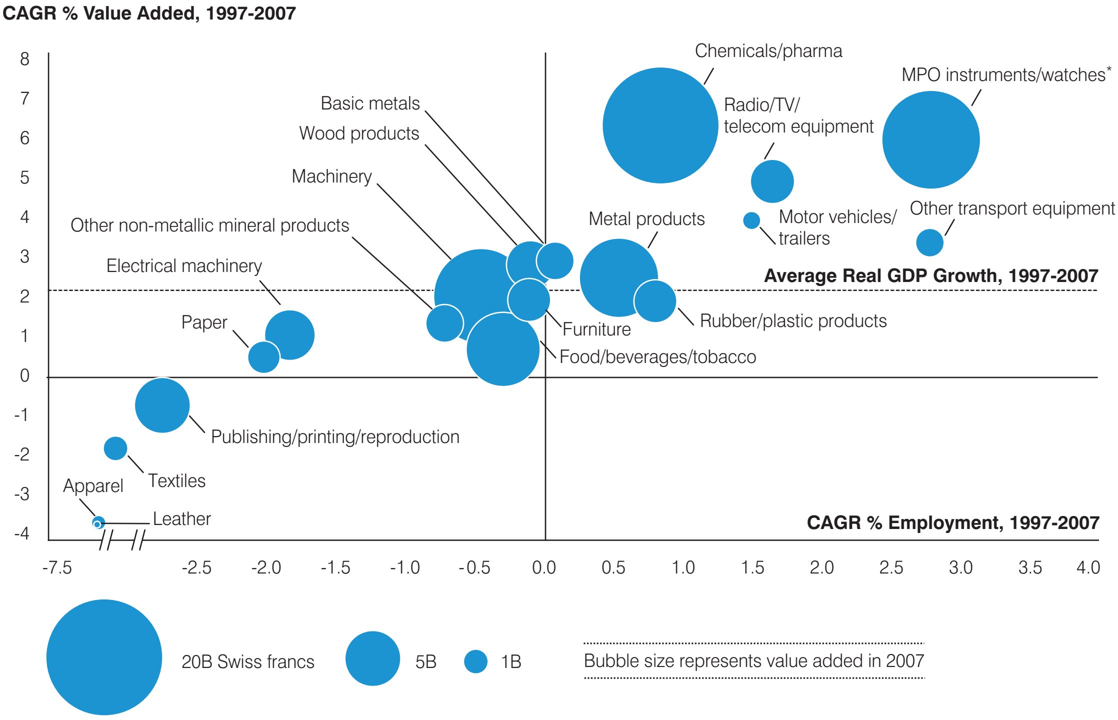
EMPLOYMENT IN MANUFACTURING
(in thousands of employees)



Source: Swiss Federal Statistical Office, Booz & Company analysis

Exhibit 6
Growth in Swiss Manufacturing Industries' Value Added and Employment, 1997-2007

MANUFACTURING SECTOR GROWTH/EMPLOYMENT GROWTH



Source: Swiss Federal Statistical Office; Booz & Company analysis
*MPO - Medical, precision, and optical

“The Swiss environment, with its openness to the outside world and its pool of highly skilled talent, is well suited to managing a manufacturing business with a high degree of complexity or precision, and with a high degree of capital intensity.”

— Y. Serra, president of corporate management at Georg Fischer

“Switzerland does a good job in protecting intellectual property rights and provides a very stable economic and political environment for companies in industries that require significant long-term investments and are capital or knowledge intensive.”

— H. Erle, EVP technical operations at Merck Serono

Nearly half of the executives interviewed by the Swiss-American Chamber of Commerce and Booz & Company indicated that they have experienced firsthand the fruits of this manufacturing renaissance. They gave the following reasons for improvements in the industrial sector:

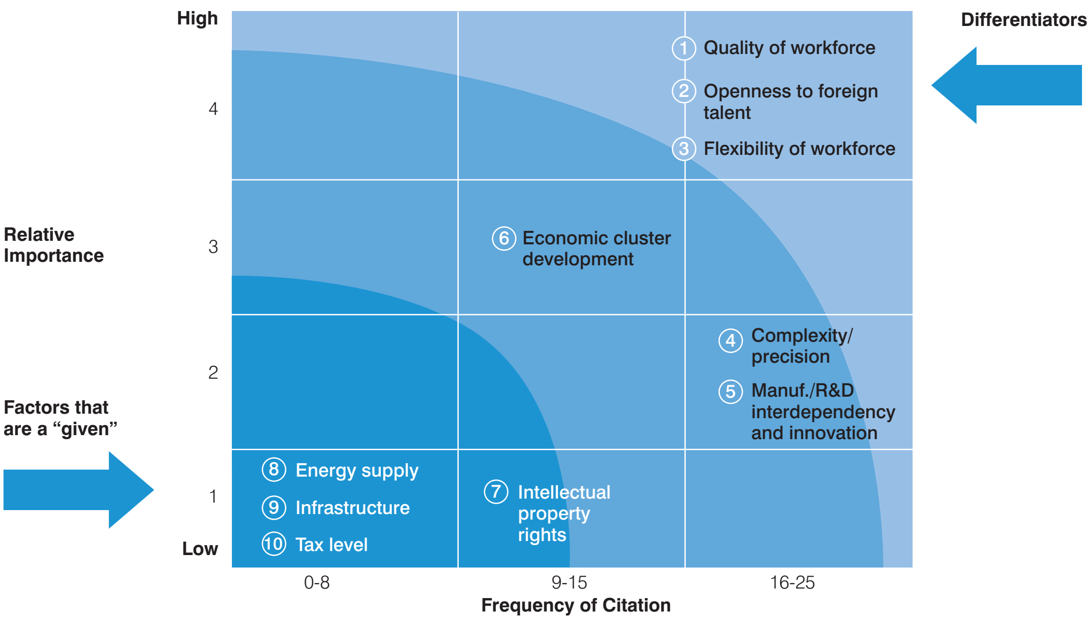
- An overall revitalization of Swiss industries throughout the 1990s was propelled by restructuring, right-sizing, and refocusing.
- Swiss companies increasingly specialized in the upper end of the product/price pyramid, emphasizing value added through knowledge, innovation, and technology delivered by highly skilled labor and management as opposed to undifferentiated labor.
- Swiss manufacturers benefited from strong global growth in markets around the world—particularly making inroads in emerging Asian markets, either through direct sales activities there or through trading partners with a strong presence in these regions.
- Policymakers ensured that Switzerland remained open to integrating talent from other countries into Swiss society and simultaneously encouraged more trade with other countries. Overall, the government ensured that the Swiss commercial landscape was welcoming to the growth of manufacturing.
- Companies with manufacturing operations in Switzerland had the right capabilities to serve expanding global economies: strong talent at the microeconomic level within clusters and networks of mutually reinforcing business activities and collaborative partnerships.

The Swiss manufacturing renaissance relied on distinctive and in some fashion unique features of the country's economy. The executives interviewed ranked 10 specific root causes for the success of manufacturing in the past several years (*see Exhibit 7*).

Exploring the root causes of the Swiss manufacturing renaissance more deeply, the executives shared essential insights about some of the most important aspects of Swiss industrial strength; if the current environment is not sustained, the loss of these cultural and economic features could do severe damage to the Swiss economy.

Exhibit 7
Root Causes for Success of Manufacturing During Recent Years

FREQUENCY OF CITATION VS. RELATIVE IMPORTANCE



Source: Interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes; joint study of the Swiss-American Chamber of Commerce and Booz & Company

- ***Openness and a high level of internationalization***
  This is a core component of Swiss companies and includes the following:

  – Openness to people and human talent and the ability to integrate immigrants into economically productive activities

  – Openness to appointing foreigners to top executive positions at Swiss-based multinational corporations to the point where country of origin is not even a consideration

  – Openness to foreign direct investment into Switzerland and the existence of underlying bureaucracies to support this

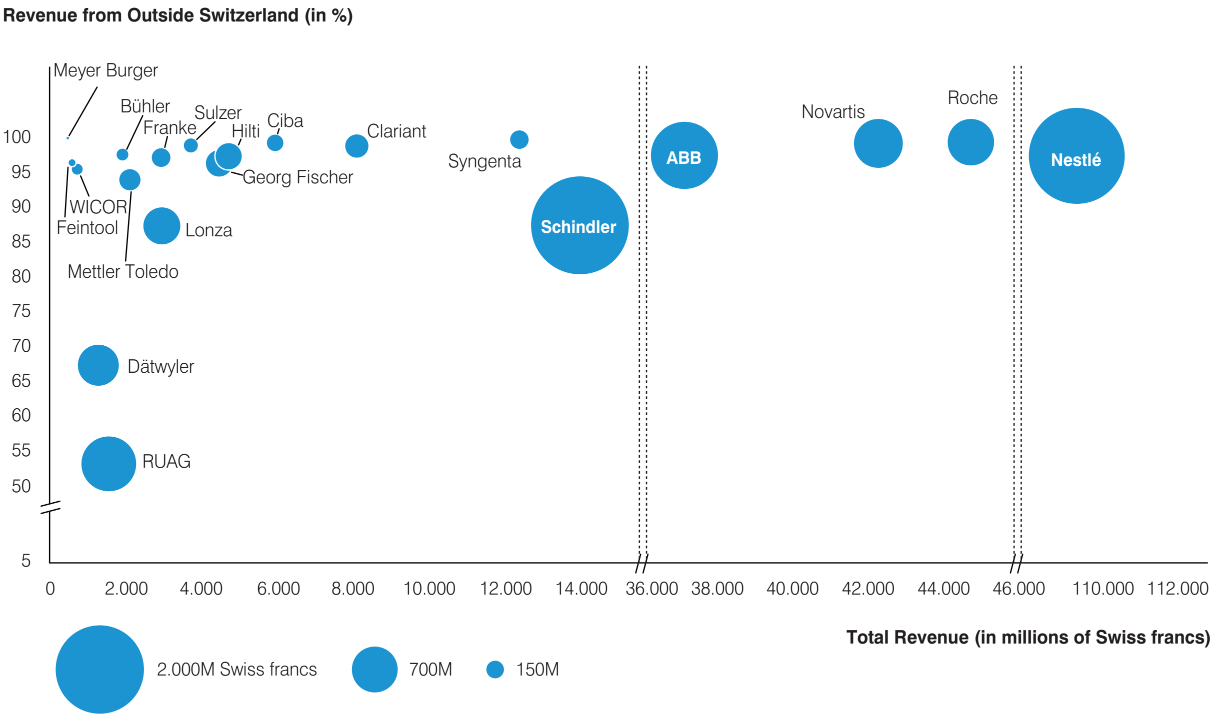
  – Pursuit of globalization by Swiss companies, from the largest to medium and small enterprises, which enabled them to gain consistent access to supply and growth markets around the world—in fact, Swiss manufacturing companies derive very little of their growth from the home market; their orientation is and should be outward (*see Exhibit 8*)

- ***Quality and flexibility of the Swiss workforce***
  – The Swiss educational system is given high marks for educating and training potential workers in dual tracks, an approach that recognizes the inherent potential of the population itself for role specialization in the economy. Swiss educational leaders explicitly plan for a balance between more academically oriented careers (e.g., science, engineering, and other professional pursuits) and applied knowledge (e.g., technical and other operational tasks and roles). However, the executives pointedly warned that the Swiss educational system may be falling behind and that the quantity of the output is insufficient.

  – Swiss workplace flexibility—particularly the ability of companies to increase or reduce employment and work days or hours relatively quickly—is considered a distinctive factor that separates Switzerland from other Western countries. Executives interviewed said labor laws and unions deserve a great deal of credit for creating an environment in Switzerland that lets companies be nimble in the face of changes in global manufacturing. Indeed, Lonza CEO S. Borgas pointed out that Switzerland's labor flexibility "effectively reduces total labor costs in production versus neighboring countries."

Exhibit 8
Share of Foreign Business by Key Swiss Manufacturing Companies

REVENUE SPLIT OF SWISS MANUFACTURING COMPANIES



Note: Bubble size indicates revenues in Switzerland; WICOR figures for 2007.
Source: Handelszeitung Top 2009 and annual reports

"Immigration of talent is essential for Switzerland. There simply aren't enough qualified staff in Switzerland to meet all of our requirements."

— E. Bärtschi, CEO of Sika Services

"The combination of excellence in food innovation and production with deep expertise in precision engineering and packaging was essential to making a success of Nespresso, a new approach to the coffee experience that creates unsurpassed aromas and taste. Switzerland is ideal for this type of innovation."

— C. Blattner, technique directeur at Nestlé Suisse

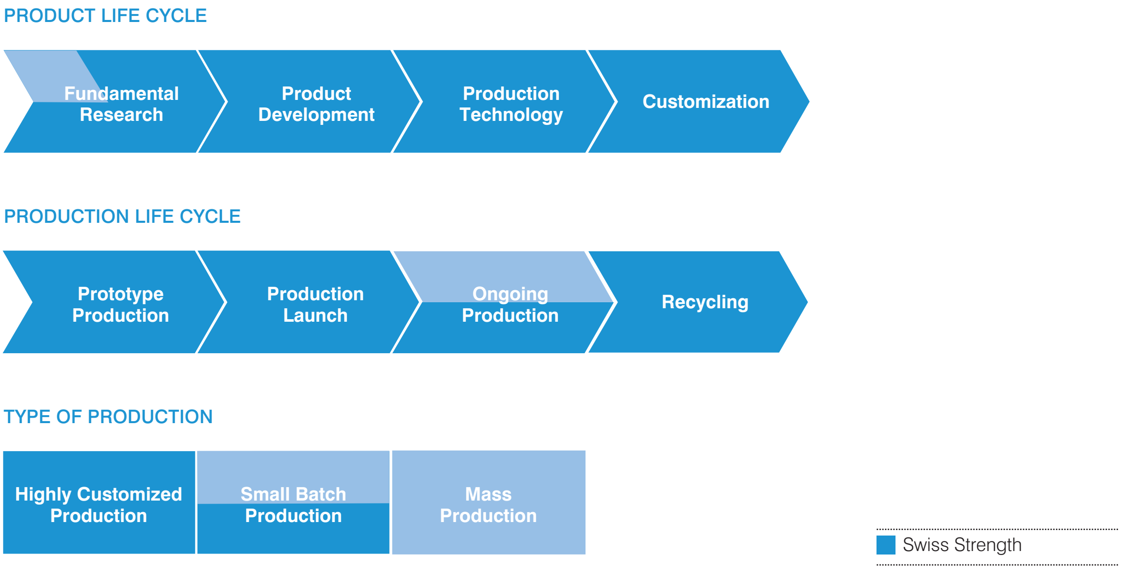
- ***Constant innovation in products and processes, which has given rise to the development of complex manufacturing processes requiring highly skilled technicians and managers***

  – This has been and will remain a key prerequisite for success in Swiss manufacturing. Indeed, the innovative capacity of Swiss companies has been deeply embedded into manufacturing processes themselves. This combination of qualitatively superior technical and management skills and state-of-the-art manufacturing systems has placed Swiss companies in strong positions at the top of the product/price pyramid, allowing them to specialize in niches requiring high mix (customization) and low volume or significant precision deployed on a large scale.

- ***Strong cluster and educational resources***
  The proximity of stakeholders within industry clusters has made communications and interactions among manufacturers, suppliers, and other partners relatively easy. In addition, Switzerland is the only country in continental Europe with two internationally top-ranked universities. That provides Swiss manufacturers with a pool of highly innovative thinkers, although the quantity of talent produced locally is insufficient to meet all of the needs of Swiss companies.

Because Swiss manufacturing is innovative, complex, high-quality, and state-of-the-art, it requires close relationships with suppliers and other partners as well as a great deal of cooperation among internal organizational functions—such as product design, engineering, logistics, and factory systems. For that reason, most of the executives believe that Swiss companies are strongest when tight value chain linkages are possible and can be nurtured (*see Exhibit 9*).

Exhibit 9
Typical Strengths of Swiss Manufacturing Companies



Source: Interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes; joint study of the Swiss-American Chamber of Commerce and Booz & Company

"The strong core of well-educated and trained technical staff in Switzerland is a significant advantage for manufacturing in Switzerland. We are able to find highly capable and committed people, and this makes the difference—we just need more of them."

— P.J. Hälg, CEO of Dätwyler Holding AG

"Switzerland does not provide the number of technicians and engineers required by us. Therefore, openness to foreign talent will be essential to sustaining our innovation and manufacturing activities in Switzerland."

— H. Zender, country manager Switzerland at Rieter Automotive Heatshields AG

"Our ability to scale production up and down in response to changes in capacity requirements is significantly advantaged in Switzerland versus neighboring countries. As a result, we have a greater incentive to employ staff in Switzerland than elsewhere."

— H. Loosli, CEO of Feintool International Management AG

"'Made in Switzerland' stands for precision in design and in execution. The cultural affinity to meeting tight specifications and avoiding deviations to known standards, which is the very definition of quality itself, is unrivaled."

— G. Kern, CEO of IWC Schaffhausen

The relative importance of each of the factors responsible for Swiss manufacturing strength differs by industry cluster and depends on how manufacturing creates value. Examples:

- ***Machinery***
  Swiss companies specialize in complex machinery, which is often highly integrated with other engineering or information-intensive systems. Developing these products requires highly qualified engineers and highly technical, skilled labor in large part because the manufacturing processes themselves are quite complex. Consequently, applied knowledge outweighs labor costs as the dominant factor in competitiveness and the products typically enjoy relatively high margins.

- ***Chemicals***
  Swiss companies increasingly focus on chemical segments and niches that offer higher potential for differentiation through application know-how, understanding of customer needs, and innovative solutions—among them, agrochemicals and specialized chemicals for custom manufacturing. Basic chemicals and commoditized specialties tend to migrate out of Switzerland following successful product launches in the country.

- ***Pharmaceuticals***
  These companies produce knowledge-intensive products with a high degree of innovation.Production processes themselves, once stable, continue to have high capital but low labor intensity.

- ***Biotechnology***
  This sector generates extraordinarily high gross margins (between 70 and 80 percent) for highly specialized products; as a result, reliable, highly skilled, and highly technical manufacturing is far more important than saving a few percentage points in costs.

- ***Medical, precision, and optical (MPO) instruments***
  Products tend to be high in variety but relatively low in production volume. Because they are highly complex, they require an extremely technical workforce to develop and manufacture. With minimal unskilled labor involvement, these products are naturally well suited to the Swiss manufacturing environment.

Switzerland enjoys significant competitive advantages over other economies as a manufacturing location (*see Exhibit 10*).

Exhibit 10
Swiss Competitive Advantages over Developed and Developing Countries

SWISS COMPETITIVE ADVANTAGES

VS. WESTERN EUROPEAN ECONOMIES	VS. MAJOR DEVELOPING ECONOMIES
- Favorable business environment	- Innovation edge
- Flexibility in labor/capacity	- Deeply rooted applied engineering and technical capabilities
- Dual-track educational system with relatively more emphasis on technical skills	- Intellectual property rights protection
- Comfortable tax environment for companies and individual	- Attractiveness as place to live and work
- Political stability and nonintrusive public sector	
- Ability to attract top-caliber engineering, technical, and managerial talent	

Source: Booz & Company analysis

THREATS TO SWISS MANUFACTURING

The joint survey of Swiss executives found that a clear majority believe that despite the recent manufacturing renaissance in Switzerland, the golden era of manufacturing is at best stable and at worst at risk. Only a small number of the executives surveyed are optimistic that the competitiveness of manufacturing in Switzerland will grow during the coming years absent meaningful changes in Switzerland itself (*see Exhibit 11*).

In most manufacturing sectors, Switzerland's upward growth potential is limited.

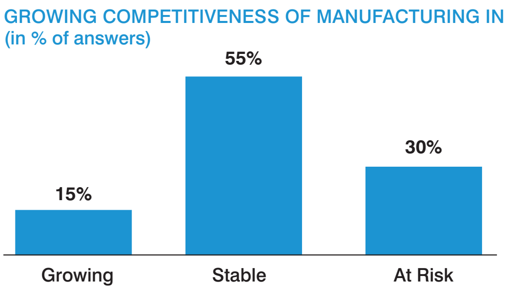
- ***Machinery***
  Asian and other emerging countries are the main growth areas, particularly as OEM plants in the auto industry and other large industrial factories leave western Europe.

- ***Chemicals***
  Switzerland is a leader in specialty chemical production, but the era of specialty chemicals is expected to come to an end before long. The next decade will be driven by materials and solutions; chemical players will need to think beyond chemicals.

- ***Pharmaceuticals***
  Switzerland has historical clusters and favorable factor conditions for pharmaceutical manufacturing. However, it is becoming increasingly difficult to fill world-class talent base needs with local workers.

- ***Biotechnology***
  Currently at a nascent stage in Switzerland, biotechnology may not significantly expand in the coming years because overwhelmingly advantageous factors for this sector are not yet in place in Switzerland.

Exhibit 11
Estimates of Swiss Future Competitiveness



Source: Interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes; joint study of the Swiss-American Chamber of Commerce and Booz & Company

"There are not too many people who have deep technical and scientific expertise in biotech. As a result, companies have to locate their operations where these critical resources can be found."

— Dr. A. Rummelt, group head quality assurance and technical operations at Novartis International AG

"Some (Swiss) government leaders are making significant efforts to help Swiss companies compete in manufacturing-related industries, but the government as a whole lacks the knowledge and expertise of what it takes to create jobs and wealth, and is insufficiently engaged with companies on this issue."

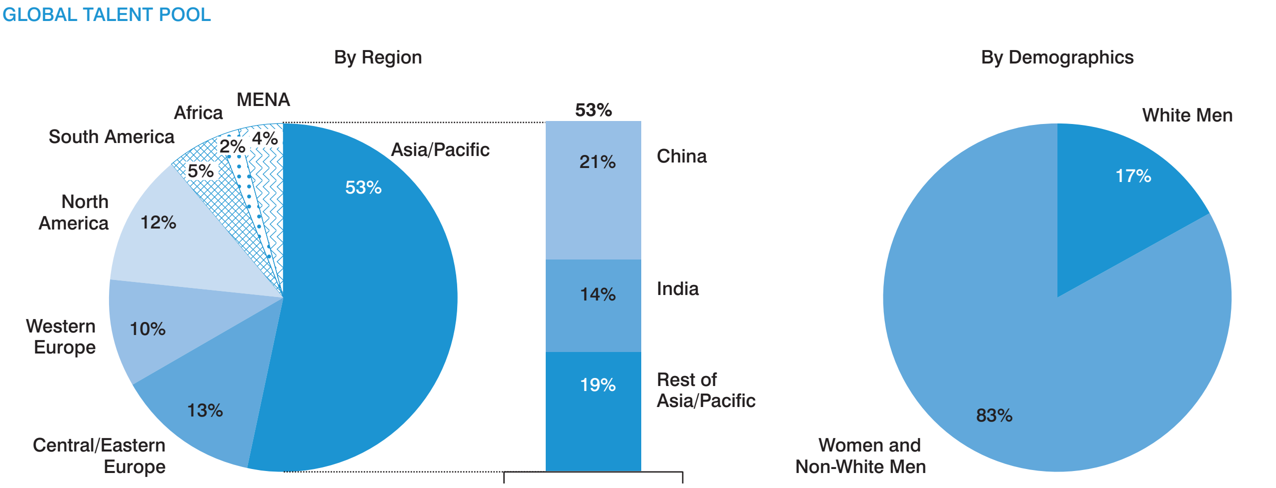
— C. Mäder, head of legal and taxes at Syngenta International AG

- ***Medical, precision, and optical instruments***
  Switzerland has some cluster advantages in this sector—for example, in the watch industry—but for much of it, sustainable advantages have yet to be established.

Corporate leaders identified the following threats to Swiss manufacturing:

1. **Growing global competitiveness and the risk of value chain migration**
   A general shift in manufacturing activity from "West" to "East"—driven by skyrocketing demand in the emerging economies of Asia/Pacific, but also Latin America and, selectively, Africa—has produced a new generation of rising giants in chemicals, pharmaceuticals, and industrial goods from these new markets. These companies are increasingly challenging the dominance of multinational corporations from Western developed markets and are proving to be resilient to changes in the competitive landscape. Traditionally, "Swiss perfection" has allowed domestic companies to maintain a relatively unassailable position at the upper end of the product/price pyramid and it would seem they would be immune from challenges by start-ups that do not have their skills. But that's not the case anymore: Companies from developing countries that initially concentrated on medium quality and high volumes are now targeting high-end segments, and even these niches are vulnerable. In fact, the global talent pool, which once so strongly favored Switzerland, is moving away from the country along with manufacturing operations, as the educational system fails to keep up with the needs of high-end industrial sectors. And as the talent pool drains, one of Switzerland's most critical advantages becomes more and more endangered (*see Exhibit 12*).

Exhibit 12
Geographic and Demographic Origins of Global Talent Pool



Source: The Athena Factor, Sylvia Ann Hewlett Associates; Booz & Company analysis; OECD & UNESCO 2000-2006 (based on availability) Education Database, Tertiary Completion Levels; India, Pakistan & Peru, 2002 UNESCO Education Database, Tertiary Enrollment reduced, assuming 33% completion rate

As manufacturing moves East, many of the interviewed executives said, there is the gnawing possibility of a domino effect in which entire value chains could follow factories to new locations in emerging markets. In this view, production plants are located in Switzerland only because R&D activities are located in Switzerland and vice versa. Any change to that arrangement would seriously impact Swiss manufacturing. There is some precedent to these concerns. As the United States forfeited untold amounts of manufacturing capacity—particularly the production of consumer electronics items—to Asian Tiger economies like Japan, Taiwan, Korea, and eventually China in the last quarter of the 20th century, a steady shift in product development and fundamental research to these countries was triggered as well (*see Exhibit 13*).

2. Loss of openness

Proposed populist measures to restrict immigration are a significant risk to Swiss manufacturing and the nation's overall economy, according to executives surveyed. Any further restrictions on immigration would likely lead to critical shortfalls in talent, because the Swiss educational system delivers the quality but not the quantity of personnel required to sustain high levels of innovation and manufacturing output in extremely complex production systems. As a result, Switzerland can ill afford the stigmatization or seclusion of xenophobia. The executives urged that the status quo must be preserved and perhaps openness to outside talent and ideas must even be strengthened.

Exhibit 13
Domino Effect of Value Chain Migration

LIKELY DOMINO EFFECT

SLIPPERY SLOPE

- Many interview partners indicated that production plants are located in Switzerland because R&D activities are located in Switzerland and vice versa
- There is a risk that if, for whatever reason, manufacturing or R&D activities are transferred out of Switzerland, other elements of the value chain will follow
- However, the interdependencies between the different elements of the value chain vary by industry

Source: Interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes; joint study of the Swiss-American Chamber of Commerce and Booz & Company

“To sustain the competitiveness of innovation and manufacturing in Switzerland, we will need to continue to bring in talent from abroad.”

— A. Steiner, Präsident Kommission “Bildung und Forschung,” Economiesuisse

3. **Talent pipeline backlash from neighboring countries**
   Many of the technical and managerial workers who drive the growth of Swiss manufacturing immigrated to Switzerland at the expense of other countries, which initially paid for educating these workers. Indeed, the largest contributor to the Swiss talent pool is Germany, yet that country does not reap the benefits of these workers (including taxes paid). And while neighboring governments have not yet formally erected barriers or disincentives to talent exiting to Switzerland, there is an increasing awareness of this situation and growing anger about it in some parts of Europe. In the long run, the stability of a manufacturing and innovation model that relies on foreign-produced talent without compensation to the home countries of the workers is questionable.

4. **Inability to create new industries**
   Many senior executives questioned Switzerland's ability to establish new industries and develop startup companies that can compete with global entrepreneurs. They made a number of suggestions as to areas where new manufacturing activities could be fostered—such as innovation-oriented industries like green technology, renewable energy equipment, and breakthroughs in healthcare devices. But there was no clear consensus about what it would take for this to happen and whether companies themselves or the government should take the lead.

5. **Government inaction**
   Although Switzerland has a long tradition of self-reliance and a lingering suspicion of the role of government in economic affairs, many executives gingerly made the argument that there is a lack of awareness in the government itself as to what has created Switzerland's manufacturing renaissance and its excellent industrial position today. Moreover, they said, the government lacks an intellectual engagement with the issues facing manufacturing as the global economy continues to evolve.

There was clear anxiety about whether the Swiss government and the country as a whole will make the right choices on immigration issues related to openness, and whether policymakers in Bern will be able to encourage and support the appropriate educational, cultural, and economic environment to ensure that Switzerland is positioned to sustain its role in manufacturing in the future. Compounding these fears are nagging doubts about the weak federal system in Switzerland and whether cantonal administrations have the necessary foresight, expansive worldview, and commercial understanding to adequately accommodate the interests of multinational corporations doing business in complex manufacturing environments.

Hiding behind insularity is not an option anymore, particularly when emerging countries, often with authoritative governments, are using the hammer of state-driven capitalism to actively promote and attract manufacturing investments in their regions, effectively redefining what is considered fair play. Equally important, sovereign wealth funds, many of which are linked to explicit industrial policies of governments around the world, increasingly have the ability to disrupt entire industries through targeted investments.

Yet even though that sentiment was very pronounced, executives were not willing to cede many responsibilities to the Swiss government.

Taken as a whole, the external threats to Swiss manufacturing can be depicted by a global "arc of growth," which is accelerating changes in economic activities and impacting virtually every aspect of commercial life for companies and workers (*see Exhibit 14*).

Exhibit 14
The Arc of Growth and Its Impact on Global Economic Activity

ARC OF GROWTH COUNTRIES

DEMO-GRAPHICALLY RICH
- China, India, Brazil: massive, dynamic, varying population pyramids
- Indonesia, Mexico, Nigeria, Vietnam, others: large populations, emerging economies

RESOURCE RICH
- Petro-states plus sovereign wealth funds (Saudi Arabia, Abu Dhabi, Qatar)
- Brazil: agriculture, minerals
- Russia: oil, gas, minerals
- Australia: minerals

SPECIALIZED/ CONCENTRATED CAPABILITIES
- High-tech incubators (Taiwan, Singapore, Switzerland, Nordics, Baltics)
- Investment clout (Norwegian sovereign wealth fund)

COLLECTIVE IMPACT
- Increasing geopolitical power
- Influence on global institutions (e.g., Copenhagen conference, U.N., IMF, World Bank, WHO)
- Multipolar world
- New class of competitors
- Affect the way we think about:
  Market access and development
  Investments
  Innovation
  Sourcing/manufacturing

Source: Booz & Company

CALL TO ACTION

There is little doubt that doing nothing to ensure the future of manufacturing in Switzerland is unacceptable. But precisely what to do remains a very large and, thus far, intractable conundrum. To grow the manufacturing share of Swiss GDP, it is necessary that increases in manufacturing productivity remain at least at today's high levels and that manufacturing employment increases faster than it has in recent years. **This will require establishing new manufacturing-oriented industries in Switzerland, as well as policies that encourage the expansion of manufacturing.**

A clear consensus emerged among the executives interviewed that the government should at a minimum focus and take sure steps on three issues related to manufacturing:

- ***Qualified personnel***
  – Sustain the educational system at the highest level possible, while tailoring training and curricula to meet the requirements of the current and future economy.
  – Remain open to immigration for qualified talent.

- ***Openness***
  – Foster and retain economic, political, and social openness.
  – Drive free trade agreements and international linkages.

- ***Macro conditions***
  – Retain favorable factor conditions at the macro level—for example, in protecting IP rights.
  – Ensure that Switzerland remains a top destination for the most innovative and creative enterprises.

“Priorities for Switzerland in terms of developing new industry clusters should be in areas where Switzerland has or can create advantages, including the following areas: the environment; energy production, efficiency, and storage; lightweight materials for transport sector; health; and nutrition.”

— Dr. M. Menrath, member of the board at Bühler Management AG

“The cantonal governments in Bern and Solothurn were instrumental in working with the medical service business community to develop a medical cluster. The cluster, now with over 200 companies, has helped many companies establish or expand their activities in Switzerland.”

— T. Wahl, vice president operations at Stryker Osteosynthesis

“The deeply cantonal influence in the Swiss political system makes it difficult to develop a critical mass of capabilities in emerging industries. For Switzerland to succeed in biotech broadly will require more of an Anglo-Saxon orientation to risk and a VC community with more depth and breadth in the life sciences.”

— A. Brouwer, chairman of Celgene International Sarl

“To succeed in emerging industries, the Swiss business community and government will need to take a more active role in catalyzing the development of new clusters.”

— Prof. Dr. Georg von Krogh, Chair of Strategic Management and Innovation, ETH Zurich

But while these steps are a good start, they still reflect a society unwilling to see the value that government can bring—and, in today's globalized environment, must bring—in directly propelling and sustaining critical areas for future growth of the overall economy.
It would be hard to argue that, considering its significant position in recent Swiss growth, manufacturing is not a critical and essential factor in the success and well-being of the country. Yet all of the more palatable actions that government is being asked to implement are merely ways to maintain the status quo rather than to jump-start new industries and entrepreneurial activities—both of which are absolutely essential for the Swiss manufacturing renaissance to not only continue but expand.

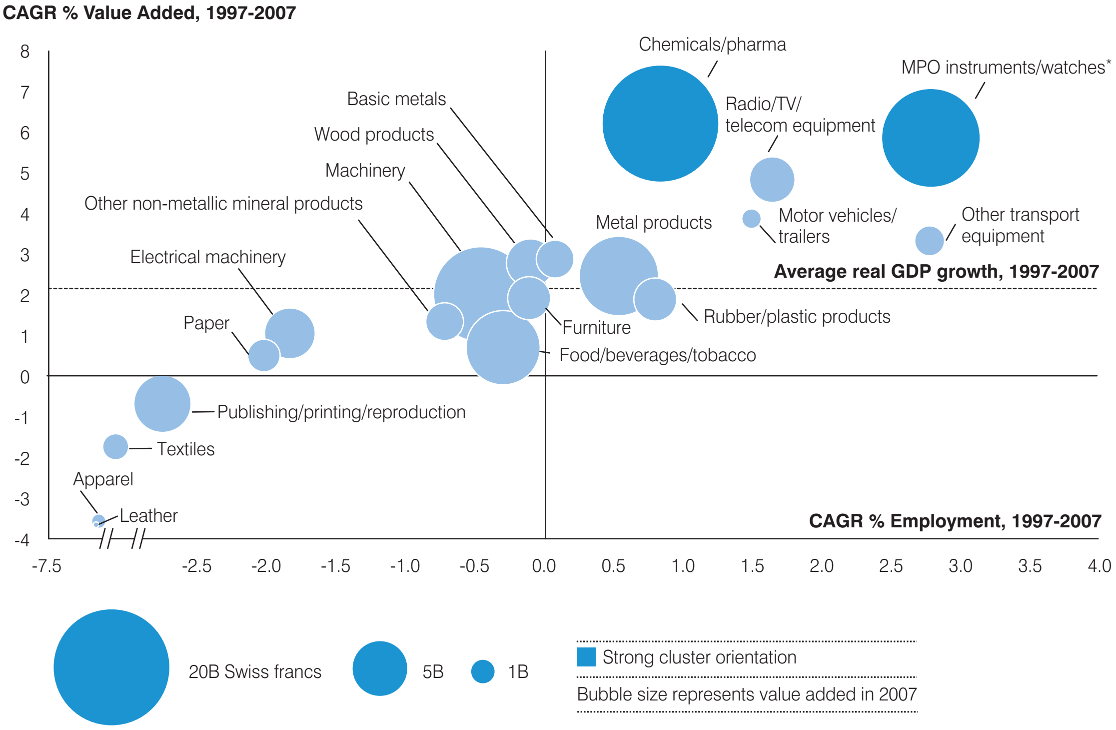
Harvard Professor Josh Lerner describes the precise role of governments in promoting entrepreneurial and venture capital activity this way:

"[A] careful balancing act, combining an understanding of the necessity of their catalytic role with an awareness of the limits of their ability to stimulate the entrepreneurial sector.... [Yet], virtually every hub of cutting-edge entrepreneurial activity in the world today had its origins in proactive government intervention. Similarly, the venture capital industry ... has been profoundly shaped by government intervention."
— *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It* (Princeton University Press, 2009)

In Switzerland, the development of business clusters—in which interconnected manufacturers, suppliers, and other types of partners in new industries are concentrated—could be an optimum role for federal and cantonal governments, a way for them to encourage the growth of new manufacturing sectors. Two reasons recommend this approach: (1) Emerging competitors from Asia/Pacific are finding substantial success with clusters, whether as special economic zones or as entire cities built around a manufacturing sector, such as the automotive cluster near Shanghai in China's purpose-built city of Anting; and (2) some Swiss industrial sectors (such as chemicals, pharmaceuticals, MPO instruments, and watches) have naturally gravitated to clusters in the past, and their growth rates have outpaced those of other, noncluster sectors (*see Exhibit 15*).

Exhibit 15
Swiss Industries with Strong Cluster Orientation

MANUFACTURING SECTOR GROWTH/EMPLOYMENT GROWTH



Source: Swiss Federal Statistical Office; Booz & Company analysis
*MPO - Medical, precision, and optical

There are many options for how these clusters could be established, but in general, governments can encourage their development through subsidies, tax credits, favorable treatment for venture funds, and mentoring programs focused on targeted industries.

Many senior executives identified green technology, new materials (including nanotechnology), transportation technologies, and alternative energy as opportunities for Swiss manufacturing growth and possibly new cluster formation. Other potential growth areas that were mentioned included agrochemicals and clean-room technologies (*see Exhibit 16*).

In Switzerland's manufacturing sector, the risks of inaction outweigh the risks of purposeful, focused action, even if that action is not perfect. If Switzerland decides to take a hands-off approach to future manufacturing development, there is a very real probability that the manufacturing renaissance in Switzerland will end, continuing a process of periodic, small renaissances on a long-term path of decline in overall manufacturing activity in Switzerland.

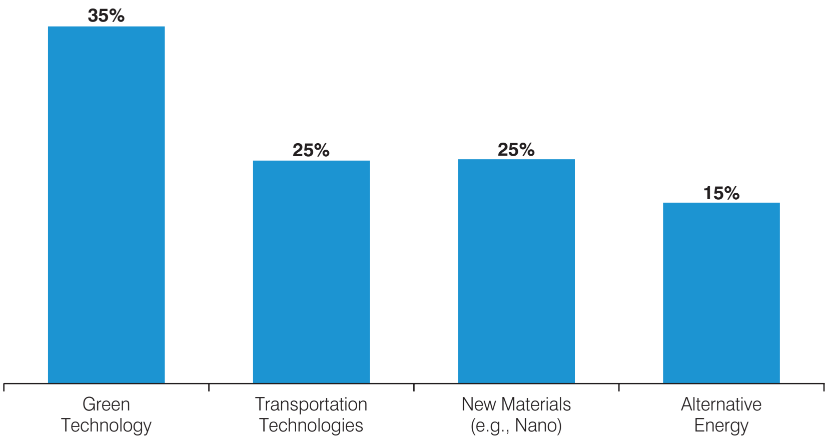
If this occurs, the Bell hypothesis, developed by Daniel Bell, would essentially play out again. It states that as an economy develops, manufacturing's share of GDP inevitably declines as so-called lower-value activity, like factory work, is replaced by higher-value activity, such as services and knowledge work. Although Bell's ideas have gained credence around the world, there is an intensifying debate in developed nations—most especially the United States, the United Kingdom, and France—as to whether the path from lower- to higher-value work is actually unavoidable and, for that matter, desirable. Perhaps, it is posited, the disappearance of manufacturing is caused by the choices that governments and companies make over time. Indeed, many of America's leading CEOs and scholars believe that the U.S. has made the wrong policy choices and that the government itself "lost manufacturing" to Asia.

The decline of manufacturing in Switzerland would raise serious and intractable new questions: If manufacturing cannot or does not fill the gap that financial firms are leaving, how can Switzerland become more of a service-driven economy? What services can Switzerland compete in? And how will it compete? And, again, what role should the government play?

Because of the manufacturing renaissance, still ongoing in many respects, Switzerland has the opportunity to escape the Bell hypothesis—but only if it makes the right policy choices. Whether the government and businesses do this will not be in doubt much longer. Indeed, it will be more than evident by the state of the Swiss economy in the next few years.

Exhibit 16
Opportunities for Manufacturing Growth

(in % of provided answers)



Source: Interviews with more than 25 senior executives of manufacturing companies in Switzerland; joint study of the Swiss-American Chamber of Commerce and Booz & Company

“The future of manufacturing in Switzerland will have to be in innovation-intensive industries—for example, in areas such as green tech and alternative energies.”
— W. Exner, co-head ETBA at WICOR Holding AG

“Green tech would be a very natural growth area for Swiss manufacturing. We believe the government, with the close involvement of companies, can play a role in supporting the development of this industry.”
— G. Kern, CEO of IWC Schaffhausen

KEY FINDINGS

- Manufacturing plays a powerful, central role in the Swiss economy with the clear potential of remaining an enduring element of wealth creation and sustaining the nation's high living standards.
- However, in the face of a rapidly changing global economy and shifting landscape with new players and potentially changing rules, Switzerland cannot take success as a given.
- Switzerland Inc. needs to seize the opportunity to preserve manufacturing as a crown jewel of the Swiss economy.
- Some of Switzerland's strengths—openness to foreign talent, high-quality workforce, constant innovation, and strong value chain linkages—may not survive policy changes, global challenges, and declining educational standards.
- The recent Swiss manufacturing renaissance will fail unless the Swiss government plays a stronger role in maintaining immigration, educational, and economic policies that support manufacturers and simultaneously develops a proactive stance for widening the reach and success of the manufacturing sector.

SURVEY METHODOLOGY

In late 2009 and early 2010, the Swiss-American Chamber of Commerce and Booz & Company conducted a survey and series of interviews with top executives and experts of 25 leading Swiss manufacturing companies, business organizations, think tanks, and research institutes.

The survey questions covered seven broad areas related to manufacturing competitiveness:

1. There is some evidence of a manufacturing renaissance in Switzerland measured by gains in output, productivity, and head count.
   – Are you seeing this?
   – In what way has this affected your manufacturing activities in Switzerland?

2. Do you believe that manufacturing competitiveness is growing or declining in Switzerland?

3. What are the micro and macro drivers of manufacturing competitiveness in Switzerland that are most relevant to your company and industry?

4. How intertwined are your manufacturing operations in Switzerland with other parts of your broader industry ecosystem—such as having a unique and reliable supply base in the country? How strongly does this constrict potential plans for relocation?

5. How intertwined are your manufacturing operations in Switzerland with other parts of the company's value chain such as R&D, innovation, production, certification, inspections, and quality control activities? How strongly does this constrict potential plans for relocation?

6. What are the biggest opportunities for growth in your company that would increase manufacturing activity in Switzerland?

7. How has the global economic crisis impacted your manufacturing operations in Switzerland?

For the purposes of this report, we used the Organisation for Economic Cooperation and Development's definition of manufacturing: "the physical or chemical transformation of materials of components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. Included are assembly of component parts of manufactured products and recycling of waste materials."

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In addition, the following Booz & Company experts provided their industry and functional insights on Swiss manufacturing:

Carlos Ammann, Partner, Zurich
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Rolf Habbel, Partner, Zurich
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