

How will automation affect economies around the world?

February 2018

All countries will feel the impact of automation, but at different speeds and in different ways. In this podcast, McKinsey Global Institute looks at its likely impact in China, Europe, and India.

New technologies such as artificial intelligence and automation are reshaping the workplace globally. All countries will feel the impact in some way, shape, or form. In this episode for the McKinsey Global Institute's *New World of Work* podcast, MGI directors Jonathan Woetzel and Jacques Bughin and MGI partner Anu Madgavkar examine automation's likely impact in China, Europe, and India.

Podcast transcript:

Peter Gumbel: Hello and welcome to the latest episode in our series on the new world of work. I'm Peter Gumbel from the McKinsey Global Institute, and today we'll be taking a look at the quite different ways that new technologies like automation and artificial intelligence will affect work in different parts of the world. Specifically, we'll be looking at China, Europe, and India. These differences come about for a number of reasons that we explain in our new MGI report on the future of work, which is called *Jobs lost, jobs gained: Workforce transitions in a time of automation*. Among the reasons for these differences are different levels of economic development, different wage rates, and different potential for automation adoption in different economies.

First, let's talk about China. Here to do so is Jonathan Woetzel, director of the McKinsey Global Institute, based in Shanghai. Jonathan, perhaps you can start by telling us where the Chinese workforce is at the moment. There's been an incredible shift over the past 25 years out of farming and into industry. What does the future look like?

Jonathan Woetzel: The workforce is in transition. It's been like that for a couple of decades. The outlook is for more of the same. First of all, China is only about 52 percent urbanized. There's roughly another 300 million people who are coming in from the farms to the cities and to work in industry and services. Every year, another 10 million to 12 million people are changing their work. And on top of that, now we've got an increase of productivity in that industrial

and urban workforce, which is a function of automation but also of just an improvement in management approaches and the investment of capital.

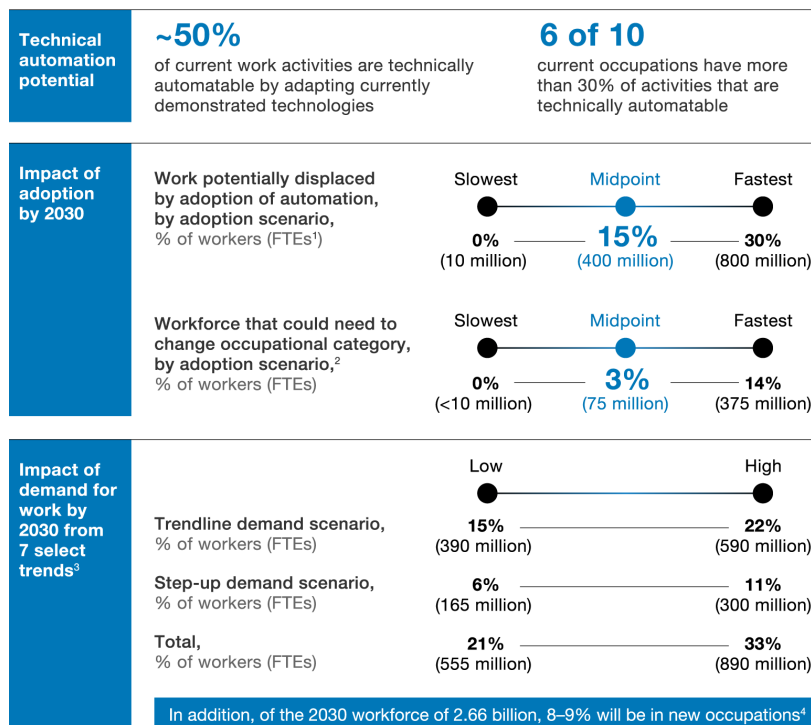
Each and every year, the average Chinese worker is approximately 12 percent or 13 percent more productive and creates more value add than the year before, which is astounding. And that's been going on for decades. And it says two things. One is that the Chinese workforce can become more productive every year, but it also says that the Chinese workforce is very unproductive right now. There's a lot of upside if we compare the productivity of the average Chinese worker to the average American worker. It's anywhere between three and six times as low. So there's a big gap. All of this is saying that the workforce is rapidly in transition. It's automating. It's becoming more productive. It is redeploying—the redeployment rate for Chinese manufacturing is approximately 40 percent, which means that every year, 20 percent of jobs are created and 20 percent of jobs are destroyed in Chinese manufacturing, which is astounding.

Peter Gumbel: So in terms of transitions, China is already showing that it's possible and actually it's something that can happen and not be too disruptive. Or is it extraordinarily disruptive?

Jonathan Woetzel: Well, I think it's both. It's extraordinarily disruptive at the individual level. These are life-changing moments where you pick up and go from your village. Or when you are replaced in your workplace. But by the same token, this is now business as usual for China. China is, I think, in many ways showing how to manage a transition at scale and high speed, in a way which has never been done before. The thought you can literally change the jobs of hundreds of millions of people over the course of mere decades is astounding. If you had told anybody that this would happen 20 or 30 years ago, they would have laughed at you [Exhibit 1].

Exhibit 1

Automation will have a far-reaching impact on the global workforce.



¹ Full-time equivalents.

² In trendline labor-demand scenario.

³ Rising incomes; healthcare from aging; investment in technology, infrastructure, and buildings; energy transitions; and marketization of unpaid work. Not exhaustive.

⁴ See Jeffrey Lin, "Technological adaptation, cities, and new work," *Review of Economics and Statistics*, Volume 93, Number 2, May 2011.

Peter Gumbel: And how does it work with the change in skill requirements? How are they managing to cope with that?

Jonathan Woetzel: The one thing I could say about the Chinese workforce, it's probably the least romantic workforce in the world. This is a workforce that does not ask the question why. It just asks how. How will I take the next step?

For example, education. One of my favorite stories is that it's quite cheap to buy a degree in China. And if you go to the XYZ University of Science and Technology, you can probably spend a couple hundred renminbi and you can have a certificate which says you have a degree. And so people will do that.

And then you say, "Well, is that how you do a job transition?" And the answer is, the same time as they're spending a couple hundred renminbi on a degree, they're also spending thousands of renminbi—20 percent, 25 percent of their personal income—on what could be charitably called skill development—going to lectures on winning friends and influencing people, buying videos of Jack Ma explaining how to become an entrepreneur.

People are willing to invest in themselves. Yes, they'll buy the degree. But they actually want the skill. And they'll actually pay for the skill. And that is how the job transition happens in China. It is this vast entrepreneurial outburst of hundreds of millions of people saying, "I want a better life, and I want to invest in it."

Peter Gumbel: So in our new report on the future of work, one of the factors that we see as being very important for influencing the timing of automation adoption is wage levels. In China, obviously wage levels are much lower than they are in the United States or other advanced economies. But there's also been some changes there too.

Jonathan Woetzel: Yes, I think wage levels are on the rise. Because first of all, China is not a labor-rich country anymore. In fact, China has already reached its Lewis turning point. The Chinese workforce from here on in will shrink. There is still this agricultural-to-urban transition, but in terms of the total workforce and the total population, we're now on a declining trend.

So given that, the official government encouragement to raise productivity makes a good deal of sense. Saying, "You're not going to have as much input, so your productivity better go up—otherwise you're not going to have as much growth." From the wage level, higher productivity should and, for the good of the country and society, will translate into higher wages.

How that happens is a question of income distribution. I suppose the good news is that wages and consumption are growing faster than the overall economy, which indicates that we are seeing some of this increases in productivity go back to the average consumer.

For the record, over the last decade, every decile of the Chinese working population has had increases in income. So the population as a whole has been improving its quality of life and its standard of living. Granted, some people have been improving it a lot faster than others.

Peter Gumbel: Okay, so given these various elements, you've got the shrinking workforce, you've got relatively low wages still, and obviously you've got this shift into industry, how is automation going to play out in China?

Jonathan Woetzel: First of all, China will be very accepting of automation. And China is very encouraging of it in that it realizes that in order for China to become rich, it needs to become productive. And that there isn't going to be any other path than to improve the quality and the capacity of the workforce.

So we will see China innovating, and everything from facial recognition to machine learning, dark factories—these already are a feature of most Chinese industrial facilities, certainly the leading-edge ones. At the same time, we're going to see a growth in income, we've said particularly in middle-class income. China is the world's single greatest consumer story with its almost 20 percent of global consumer-income growth for the next 15 years coming just from working-age Chinese. That, in turn, drives a huge employment boom to provide the goods and services for the middle class, everything from healthcare to recreation and culture to education to consumer goods.

The influence of automation will be a factor in accelerating the productivity. But it won't necessarily lead to a concern about job shortages per se or, for that matter, work shortages. There will be rather an impetus towards a use of the technology to create more productivity in the economy, both in terms of efficiency and also in terms of growth and providing services and value added, which will be the new jobs and the jobs that are going to serve the middle class.

So in many ways China is a bicycle, and one has to keep pedaling. And this is just that much more fuel for that bicycle of growth.

Peter Gumbel: Sounds like automation is going to be the engine in the bicycle. Thank you very much, Jonathan.

That was Jonathan Woetzel, who is a director of the McKinsey Global Institute, based in Shanghai, giving us his view of China. Now we're going to go across the world to his colleague, another MGI director, this time based in Brussels, and that's Jacques Bughin. Jacques, thanks for being with us.

When I was looking at your work on artificial intelligence (AI), it was quite striking to see that the United States and China seem to be taking the lead, whereas Europe seems to be rather far behind. Is that a fair assessment?

Jacques Bughin: It's a fair assessment with two twists. Twist number one: AI as a supplier, an inventor of technology, seems to come out from the US and China. And China has been very explicit, as a country, to say they want to win the war for AI and be the one providing to supply all of these technologies. The US has been quite smart in digital technologies. We have large companies that are investing in AI. AI is actually a necessary set of technologies to improve the products that they have.

Now Europe has been lagging in digital. And if you lag in this technology, the learning curve is going to be tough for you. We see pockets in Europe of AI companies. The AI tech is quite large if you look at it, but it's quite concentrated in cities like Zurich, most of the time in cooperation with technical universities and obviously London. But guess what? The companies that are in Europe has been pretty much built by the US guys. Things have been happening like Google buying DeepMind and so on. Europe is there as well, but it's not as varied and as large as we can imagine.

And the second thing is that remember, for the future of work to happen, it's not going to be just the ICT [information and communications technology] part and supply side. It's going to be the development side; ie, are people adopting these technologies? And from the data, what we see is that Europe is pretty much okay. But China is already there. The US is slightly ahead. And some of the countries in Europe—the digital frontrunners, the small countries—are actually a bit ahead in experimenting and using these technologies.

Peter Gumbel: So let's just turn to what the impact of automation could be for Europe. Clearly you have some issues in including a high potential for automation and also a relatively slow-growing economy, which based on the research that the McKinsey Global Institute has just published, add up to essentially the idea that automation could come earlier rather than later and have quite a big effect on the labor force. What are the implications here for European countries and societies?

Jacques Bughin: These technologies have the potential to shape the future of businesses and the future of work. That means that a lot of these technologies of AI, which today are quite robust and proven, can do cognitive tasks as well as you do.

Technology usually drives productivity. The key question is, what is this productivity going to lead to? Is it to invest in the economy to create new jobs? And what we believe is exactly that. It will create new, extra jobs. Jobs that you have never seen before. Every decade, we create 10 percent of jobs that you haven't heard of before. Think about the day we started all using Google and search, and search-marketing jobs were invented. Now we also invented cloud engineers. These jobs are something you couldn't imagine would exist 20 to 30 years ago.

And finally, if the economy reinvests again of productivity, that means that productivity will be spent in the economy. Net-net, we believe that there will be reallocation of skills and jobs. Job markets could be quite resilient, and Europe is likely to be in that case, too, provided that the productivity gains are happening and that they're reinvesting in the economy. That trade-off between jobs disappearing with new job allocation will depend on the speed of adoption and whether we use these technologies not for simply efficiency, but for exciting, new product innovations.

And that's the key. These technologies will provide productivity gains that we haven't seen in a long time in Europe, where Europe is actually challenged by a productivity growth which is not that great—and on top of that an aging population, which means that the way to create wealth in the economy is quite complex.

Peter Gumbel: There is also a question about the redeployment and the reemployment in Europe. And Europe famously doesn't have very fluid, labor markets. How much of that is going to be a serious issue for European leaders to deal with?

Jacques Bughin: You put your finger on the real issue of this picture. This picture will only happen if we manage that reallocation. And we should not hide from the fact that this is not only complex as a process, but the size of it is not something small. But as you said, we have labor markets in Europe that tend to be slightly more rigid than other markets.

A large effect is actually job reorganization. Companies adopting this technology will have to reorganize the type of jobs they offer. How easy would it be to do that? Companies are going to have to reorganize the way they work to make sure they get the juice out of this technology. So we need to make sure this thing happens, and we know it's an organization challenge.

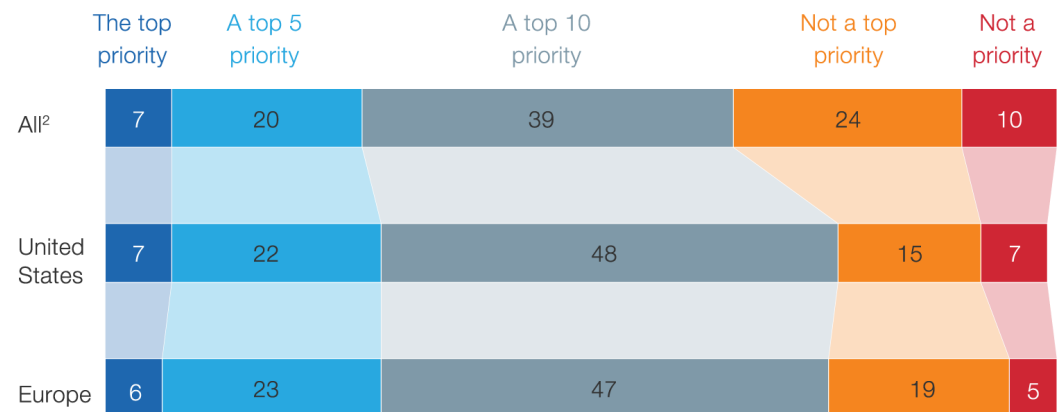
Skills will be more an upskilling game than anything else. And the skills that will be interesting to develop obviously are skills that tend to be much more complementary to the cognitive skills of those automation technologies. Now if we think about the extra commutative skills that will come out, they tend to be social. They tend to be emotional. They tend to be about creativity. So this is the challenge [Exhibit 2].

Exhibit 2

How important is addressing potential skills gaps related to automation and/or digitization within your organization's workforce?

Private-sector organizations with >\$100 million annual revenue¹

% of respondents by perceived priority



¹Total n=283 respondents (US n=76, Europe n=115).

²All includes rest of world.

Note: All analysis filters out "Don't know" responses from data set. Figures may not sum to 100 percent, because of rounding.

How do we unleash this type of new skills into business processes? These are skills that possibly we never get the chance to nurture in the way we work because they were not needed. But, you know, think about you as a kid. The mobility within industries is actually quite small. In this case, obviously the impact of technology would be very different sector by sector. And the mobility will require both upskills and possibly intersectoral mobility. This is possibly one of the key challenges: How do we do this? How fast can you get reorganization internally? How fast can we get upskilled for the new jobs to be fitting to interact with automation technologies? And are you prepared to be inter-mobile across industries?

That's not the same as a rigid, labor market. It's actually three things within the labor market that needs to happen whatever the country is where you are. If this takes too long, if it takes two to three years for any individual to do, that's going to create friction. And that friction has to be managed to be shorter. From a social point of view, we need to find ways that people can have the financial means to address that transition. It's not a question of either/or.

Europe is actually the test bed for that because we have an interesting social-security potential. And on top of that we see countries slowly adopting this experiment with the two sides of social and technology. So let's learn from that, is my message.

Peter Gumbel: So let's just pick up the last point on the social safety nets. Do you think that the European welfare state, as it exists, is sufficiently adaptable to provide the transition and income support that displaced workers are going to need in this transition period?

Jacques Bughin: It's a very, very big question. I think that like every evolution, we will need to find a way to experiment and to adjust. I would just give two or three ideas. And these are just ideas that may not be great. But I think the plea from your question is much more to focus on, why not experiment with many things to see what can work?

A few things could happen. If we believe that social security has to be adapted, instead of giving people an amount of money for unemployment, why not give this type of money to create a lifelong-learning platform that they can co-finance across firms, for people like you and me to start learning even more than they did before?

Why not make sure that instead of working so many hours a week, ensure a portion of it— 2 percent, 3 percent, 5 percent of that—is actually devoted for new learnings. And these learnings, if you do them right, will give you the rights basically to get points for your pension in the future. In this concept, instead of adjusting the number of hours to work, because there will likely be a bit less work in the future, you will still work. But you work for the future. Firms have an incentive to possibly even co-finance because firms are not bad guys. They're not there to take people out. They want people that are good at doing their job and complementary with capital. And for them, they need these skills, and these skills come from job trainings most of the time. So these are a few examples that we could imagine doing.

Peter Gumbel: Well, thank you very much, Jacques. That was Jacques Bughin talking about the promise and the challenge of automation technologies in Europe.

Now we're going to go to India, where the situation is quite different. Talking to us about the situation in India is Anu Madgavkar, who is an MGI partner based in Mumbai. Anu, tell us about how the Indian employment market looks today and what it's going to look like in the next 15 to 20 years? We can see that a very young, dynamic population is growing fast. That presumably will have a big impact on employment and the labor market. Is that indeed the case?

Anu Madgavkar: India has a labor force of about 450 million, so it is a very large labor force and it's growing, as you say, adding something like eight to ten million every year. So I think the predominant question on people's minds in India is really, where will the jobs come from? And the concern tends to be really around this notion of jobless growth, questions such as, "Maybe the economy's growing at six or seven percent, but are there jobs?"

When we looked at some of the data, we found that the issue in India is not so much about the quantity of jobs that matters, but the quality of jobs. And by the quality of jobs, we mean things like the productivity that workers are actually able to generate, the output, and the wages. And a whole bunch of other conditions around their work, whether it's income security, whether it's being part of a more organized and formalized value chain, decency in work. It's those kinds of issues. And the reason why the quantity of jobs is less important is because most of the Indian workforce is in the unorganized and informal sector. It's very rare that somebody would be unemployed.

In fact, the unemployment statistics are not very reliable in India. Unemployment is traditionally as low as 4 percent and pretty much stays there through up and down cycles. It doesn't mean much. People just end up doing any kind of work that comes their way, and therefore they're technically employed, but the issue is that they're not really employed in gainful work or in productive work.

So the issue for India is really how to boost the rate of job creation in sectors and occupations and types of work that generate more income and more linkages of workers with organized parts of the business. And that is an issue we see. We see some evidence that some things are working well in India. But we do have concerns about whether that pace is good enough and a set of things that we need to do to make to accelerate that base.

Peter Gumbel: But at least the economic growth is robust, and that presumably is raising demand and helping propel consumption, which in turn creates jobs. So how important is that as a sort of a motor going forward? Is that going to be what really determines the whole employment picture?

Anu Madgavkar: Absolutely. In fact, we've looked at the data that suggests that in periods when the economy grew at 7 and 7.5 percent, the labor market actually saw a very positive transformation in the sense that there was an accelerated growth in the employment in sectors like construction, trade, transportation hospitality.

These are really the mainstays of job growth in any emerging or developing country like India. These sectors actually saw maybe 11 to 12 million jobs per year being added, while

the agricultural sector actually saw labor coming out of it. This is really important because if you compare a typical construction-sector worker with an agricultural-sector worker, there's a 70 percent uplift in productivity that comes from moving out of agriculture and moving into construction.

If we move out of agriculture and move into the transportation and logistics sector, that's again an 80 percent uplift in productivity, with a commensurate wage benefit or impact to the worker. This structural transformation—where workers are less dependent on low-productivity sectors, even at relatively low or medium scale levels, but moving into sectors that are fundamentally more productive—happens when the economy grows. Therefore economic growth is actually probably the most important driver of long-term, labor-productivity growth for the country.

Peter Gumbel: And this move out of agriculture, which is a shift we've seen in other countries—in the United Kingdom, in the United States, but also more recently in China—how recently did that begin and how much more has it got to run, would you say?

Anu Madgavkar: I think it has to run a lot more because I think we've seen it start to move in the last ten to 15 years. I mean the Indian economy only liberalized in the early '90s, and we did see sectors, mainly the services sector, actually grow only from then.

And therefore, I think we still are in a place where 45 percent or so of the labor force continues to depend on agriculture. We have a long way to go, and we have to make this transition in an era where creating jobs out of manufacturing is going to be more challenging, simply because of automation playing a bigger role in several types of manufacturing.

I think India has to think about a multi-polar strategy. It has to have engines firing in terms of sectors like infrastructure building, building out cities, which creates demand for lots of urban services and construction. It has to think about how to take the benefits of IT and digitization deep into lots of types of work that can enable less skilled workers to actually use their technology and be more productive.

It sounds counterintuitive, but there are very interesting examples from India where technology-based financial services are being taken deep into rural India by these armies of banking correspondents who are middle-skill or even low-skill people but enabled by technology to be more productive than what they would otherwise have done.

We will have to find multiple engines, and I think we can't minimize the role that manufacturing has to play as well. There are sectors in manufacturing where India can do more; the textile and garment sector is one such example. We can do more in in other areas as well. But it's got to be a combination of sector-oriented policies that boost demand across many of these areas to absorb that labor out of agriculture.

Peter Gumbel: You mentioned automation in conjunction with manufacturing. But more broadly, how do you see automation impacting the Indian economy?

Anu Madgavkar: We do see automation impacting the workforce as businesses across sectors adopt more technology. But we do find that, relative to more advanced economies, because average wage rates are still much lower in India than in advanced economies, that threshold at which it makes sense to automate a task or automate a worker's work—that threshold is much lower.

We would not see as rapid a trend towards automating work as you would in the advanced economies. But nevertheless, I think you would see something like the equivalent of 60 million workers potentially being substituted by technology in some shape or form by 2030. So the challenges of retraining and redeployment are not insignificant, even in India.

Peter Gumbel: They're not insignificant, but it sounds like the challenges are more around how to create gainful jobs and how to find work for this very large cohort of young Indians coming onto the labor market.

Anu Madgavkar: That's true, and I think the challenge gets a little bit compounded with the changing and rising aspirations and expectations of the workforce. Our analysis would suggest, for example, that there are more than enough jobs that could be created by boosting, let's say, infrastructure, urbanization, investment in affordable housing.

A lot of these jobs are going to be in the construction sector. Now the issue really is, is there a mismatch between what young people want versus the kind of work that's out there? I think there is a generation of young people in India who've grown up with the aspiration being the white-collar office job, which is typically a clerical job.

But that's the kind of job that will get automated. Therefore, there is something to do with finding more meaning and more value in doing different kinds of work even while we need to take steps to make that work decent and not hazardous. Even as we do that, there is something about the mind-set of workers and what they expect as well.

Peter Gumbel: Last question is around Indian technology, because obviously India has done very well with IT and has become a global player. Is there an opportunity here with automation for India to leapfrog and really move ahead fast and therefore speed its development?

Anu Madgavkar: I think there is. I think India's IT capabilities are an important part of its foundational digital capabilities, right. As you think about India's economy, one of the important capabilities is that you have a strong IT sector and they have innovated a business model that's worked very well for the last maybe two decades.

The demands of that type of work are changing very rapidly because of automation. That's the first trend we need to recognize, that digital skills and capabilities are going to be more important for the IT sector, and for workers in the IT sector going forward, because the clients they serve are going digital.

We also need to recognize that the IT sector is moving up the productivity curve very rapidly. And therefore, the job creation for IT professionals in terms of the IT-services industry will continue to grow but perhaps not at the pace that it has grown in the past, because they will move to productive work.

So that's, if you will, on the negative side. You do need to build new capabilities, and your job-creation pace may be slower. But there are a huge set of positives in terms of the opportunities, because as Indian businesses adopt more digital capabilities close to business, the hiring needs of an Indian consumer-products company or an Indian financial-services company are moving towards people who have skills in digital and in technology.

The IT-services sector may not hire at the same pace, but people who have the right skills can move into all sorts of different types of firms that are thinking through how they can digitize. And then this whole issue of inclusive digital transformation is a very important one in India. And I think that is also going to sustain a lot of productivity growth and job growth going forward.

Peter Gumbel: Thank you very much indeed, Anu, for that interesting discussion of the employment situation in India, given the current rapid growth of the workforce.

And that concludes today's podcast by the McKinsey Global Institute on different aspects of the changing and very new world of work. We hope that you'll be listening in to further episodes of our podcast series, which covers issues ranging from how technology has played out on issues of employment in history and whether this time anything is different to questions about skills and potentially the wages in the future as these technologies are increasingly adopted in the workplace.

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