



# **CONSUMERS AND BIOBASED MATERIALS AN INTERNATIONAL SURVEY**

CONSUMER PERCEPTIONS, CURRENT TRENDS  
AND THE ROLE OF MATERIALS IN A BIO-BASED ECONOMY



# SEEING THE FOREST FOR THE TREES

*What if an entirely different economy is more or less around the corner? What if one of nature's most abundant resources is silently waiting to be mobilized, ready to set society on a path towards sustainable prosperity? What if this is a prospect that, well, scares the living daylights out of us?*

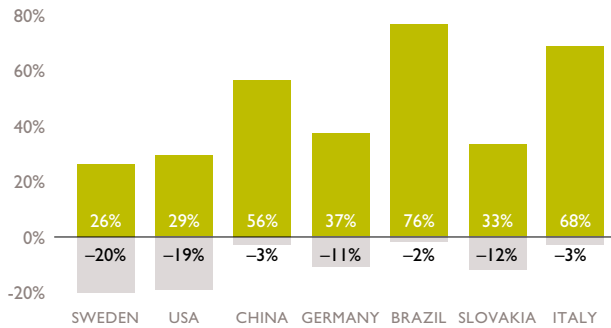
*The Global Outlook Report "A Cellulose-Based Society" explores the environmental concerns of ordinary people and their attitudes towards change. Based on a survey of 3,500 people across seven countries on four continents, it bluntly shows that a circular economy is within our grasp. However, a major obstacle remains.*

## ABOUT THE SURVEY

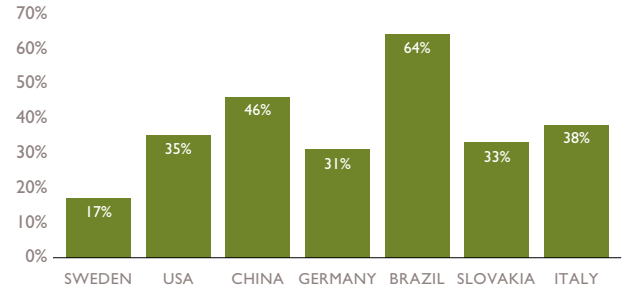
This survey was conducted was originally run by Kairos Future in the United States, Brazil, China, Sweden and Germany during January 2016 with 500 respondents in each country. The survey was expanded to Slovakia and Italy during February 2018 with 500 respondents in each country.

## **I AM, THEREFORE I WORRY**

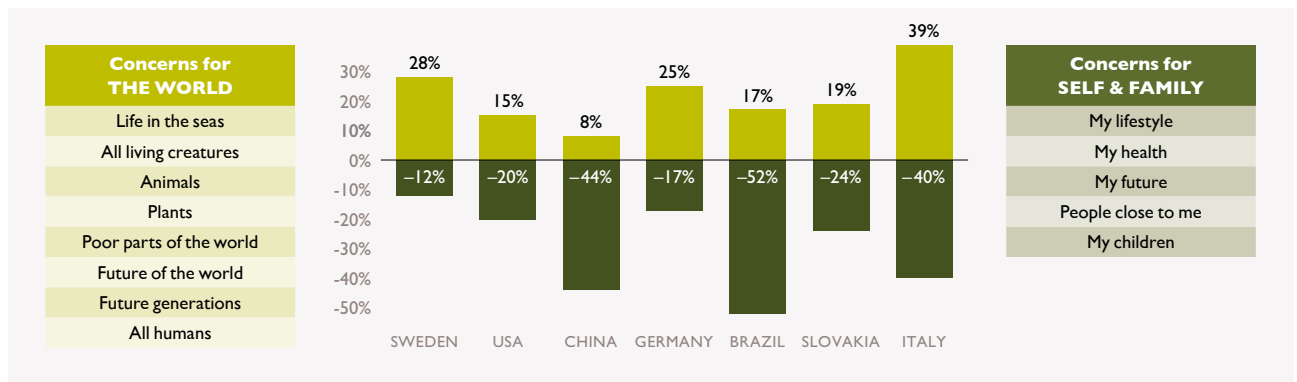
Is it true that the Chinese don't give a hoot about the environment? What about the Brazilians and the peoples of the other blazing start-up economies struggling for higher standards of living? Just in case anyone thought otherwise, the Chinese do care a lot about the environment. In fact, the urban middle classes of China and Brazil seem to be generally more concerned about the well-being of Mother Earth than the people of the "West": 76 percent of Brazilians claim they worry about the environment. 64 percent of Brazilians claim to care "very much", as opposed to 17 percent in Sweden and 31 to 38 percent in Germany, Slovakia and Italy. Surprising? Not particularly, as nations in different stages of economic development can be expected to face different kinds of environmental problems. Most of us care, presumably because we are human beings. It's just that we worry for a variety of different reasons.



How worried are you about environmental issues? Percent “very worried” above the axis, “not worried” at all below. Average of four environmental concerns: Natural disasters, global warming, resource shortage and deforestation.



Share of respondent’s reporting that they care “very much” about the environment.

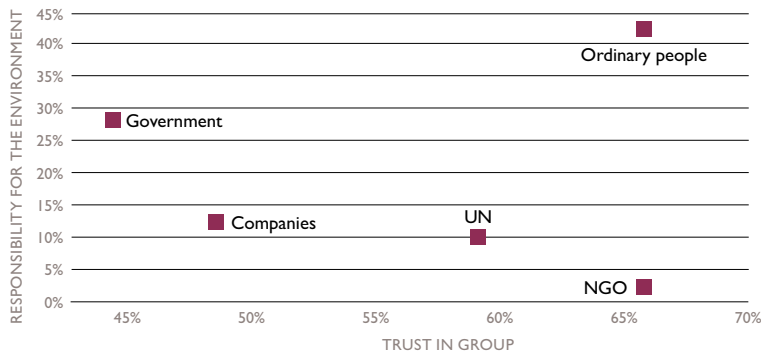
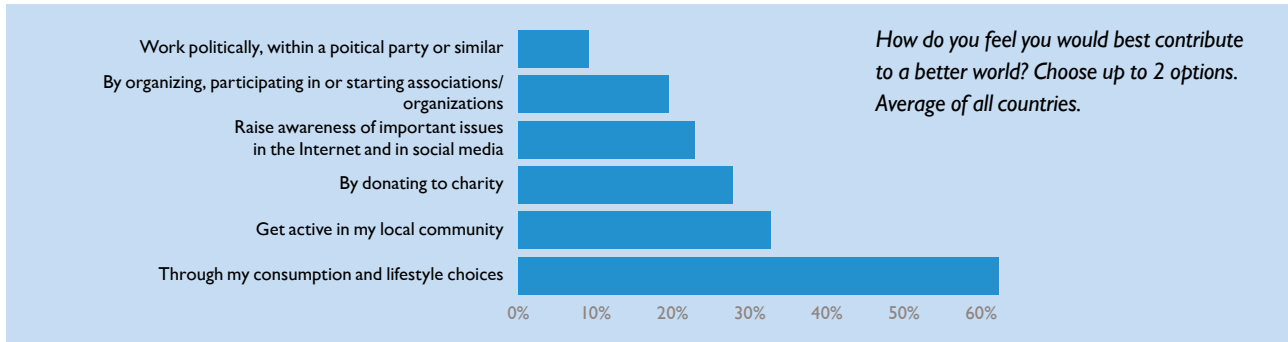


Why do we care for the environment? Two primary dividers of motivation.

## MOTIVES DIFFER

Rising seas, hurricanes, droughts and air pollution all give people plenty to think about. Consider, for instance, Earth Overshoot Day – the day each year when our consumption of renewable resources exceeds beyond that which can be generated over the course of a year. In 2018 it was August 1, meaning that we humans wolfed down resources at a rate of 1.6 Planet Earths in twelve months. That doesn’t sound very sustainable, does it? Still, when it comes to our environmental concerns, we all have our different and private reasons. Here, the survey confirms what may have been expected: Development plays a major role. Were we to picture a “Maslow’s hierarchy of needs” for nation states, the countries of the developed world would look

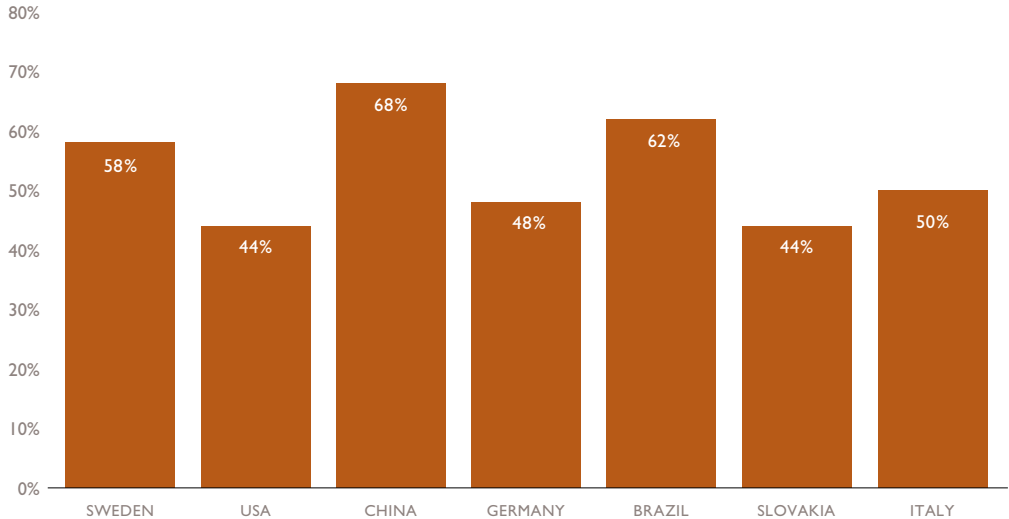
down from the top. Perhaps with their most basic needs covered, people can afford the more etheric pleasures. For example, the survey shows that Europeans care more about how environmental degradation harms the common goods – the seas, the living creatures, the plants – than they worry about themselves. In the rapidly growing yet less developed economies of China and Brazil, people are arguably more exposed to the direct effects of environmental destruction. We need only to look at the news to know, for instance, that Chinese cities have a huge problem with air quality. This perhaps explains why people in China and Brazil are generally more concerned about the state of our environment.



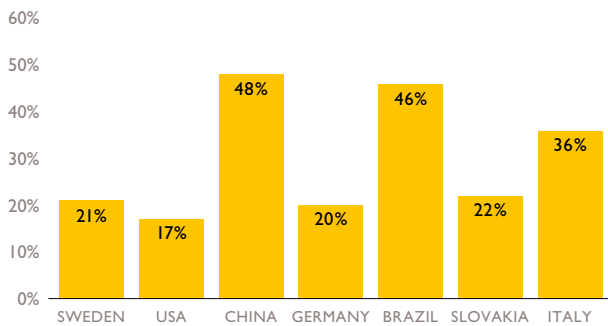
## SELF IS THE BEST HELP?

These days the environment has become a much debated topic, perhaps more so than ever before. The Paris Agreement entered into force in November 2016, and in spite of the controversies due to the United States leaving the Agreement, people may also have a reason to be a little bit more optimistic about the future. Now, at least, there seems to be a common understanding among most world leaders regarding some of the environmental challenges that humanity is facing. Still, in times of sluggish economic growth, political polarization and runaway government debt, it is difficult to know what to expect from the years to come. In the *Global Outlook – A Cellulose-Based Society*, RISE explores four different political and economic contexts of future world development. Some are worrying; others more promising. None of them, however, involves swift and decisive governmental action. Perhaps this also reflects the general sentiment of the late 2010s and early 2020s – a time of deteriorating confidence in government. It has been estimated, for example, that only 40 percent

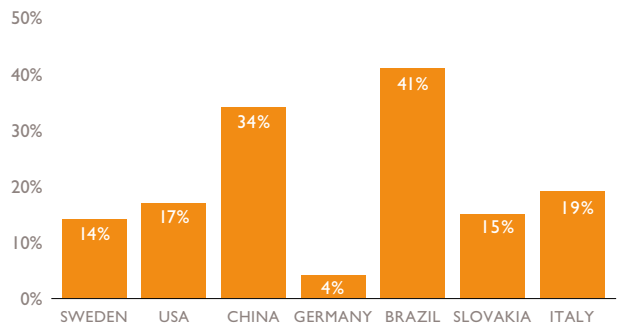
of people in the OECD countries have trust in their national leadership. This is more or less confirmed by our International Consumer Survey, where a meager 45 percent of respondents in 2016 claimed they can count on their political leaders. Presumably, this also explains why the respondents don't seem to expect much from their governments. When asked, "How do we make the world a better place?", not even 20 percent of the 2016 respondents put their money on political work. Rather, the respondents put their faith in each other. More than 40 percent think that ordinary people are responsible for the environment. Interestingly, when we extended the survey in 2018, Slovakian and Italian respondents had significantly lower levels of trust than the Swedish, German, American, Brazilian and Chinese respondents of 2016. Whereas only 15 % of Italian respondent trust the Government for environmental responsibility, the Slovaks and Italians of 2018 still are convinced that real change is achieved through consumption and lifestyle choices. That is, it is all up to you and me.



Percentage that has, on at least one occasion, stopped buying from a company/brand because they acted unethically.



Percentage that buy environmentally-friendly options “always” or “almost always”.

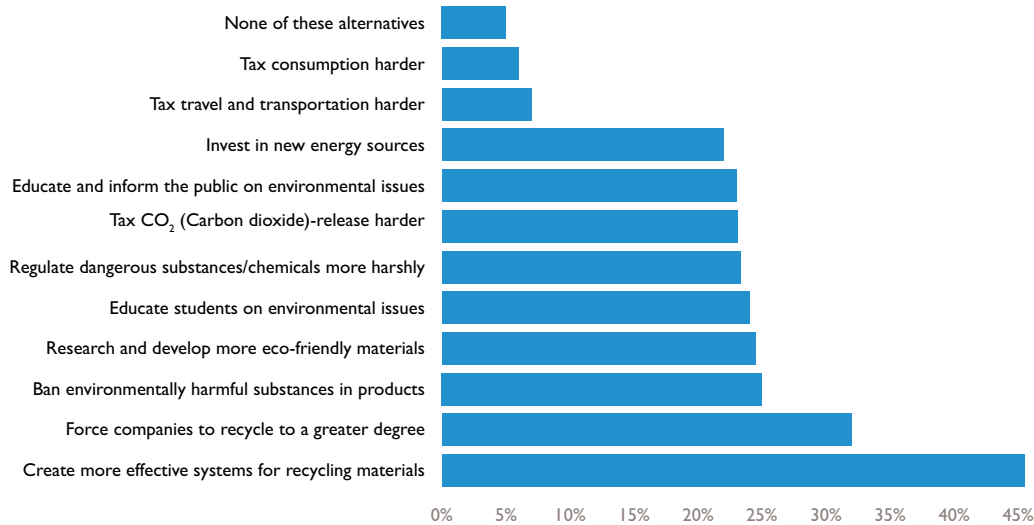


Percentage who feel guilty when they do not buy environmentally-friendly alternatives.

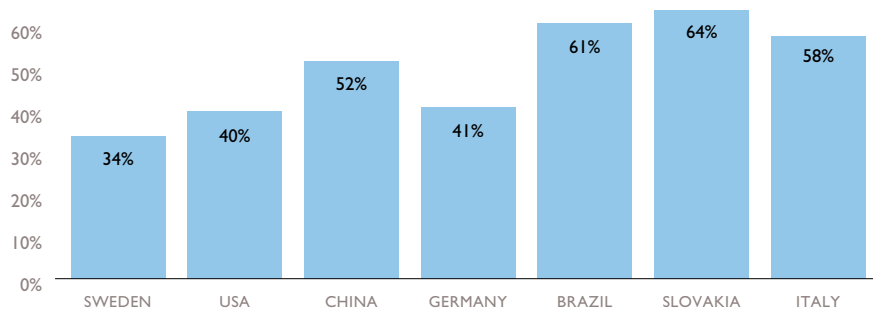
## THE RISE OF CONSUMER ACTIVISM

In 2015, Nielsen – the consumer insight company – showed that 66 percent of global consumers claim they are willing to pay more for sustainable goods. That is a pretty big number. If this is true, people are not only increasingly voicing their concerns about the environment, they are also putting their money where their mouths are. The findings are echoed in our International Consumer Survey, where nearly a third of consumers, 31 percent, are found to claim that they always or most often pick an ecofriendly alternative when available. It also turns out that many of the respondents feel bad about themselves whenever they don't. Over 40 percent of

Chinese respondents claim environmental issues give rise to feelings of guilt. In all, this is part of a pattern that demands the attention of any responsible corporate boardroom. Not only are the respondents actively seeking out ecofriendly alternatives, a slight majority, 56 percent, have on at least one occasion stopped buying products from companies because they acted unethically. Chinese consumers are particularly picky in this regard, with almost 70 percent of respondents claiming that they have boycotted a brand at least once. As to the European countries in our Survey the numbers range from 44% in Slovakia to 58% in Sweden.



What measures should society take to make the world more sustainable? Average of all countries.

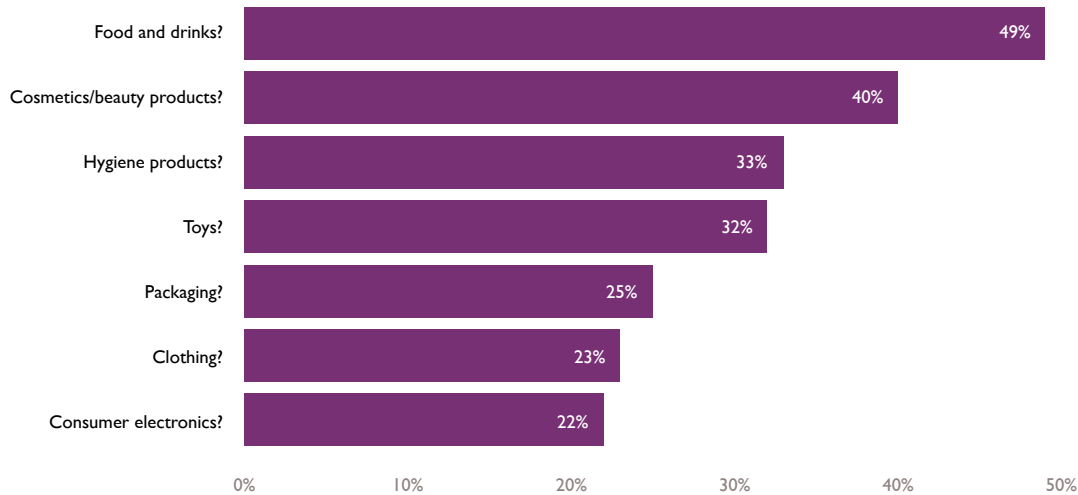


The share of respondents that chose “create more effective systems for recycling materials” when asked what measures society should take to make the world more sustainable.

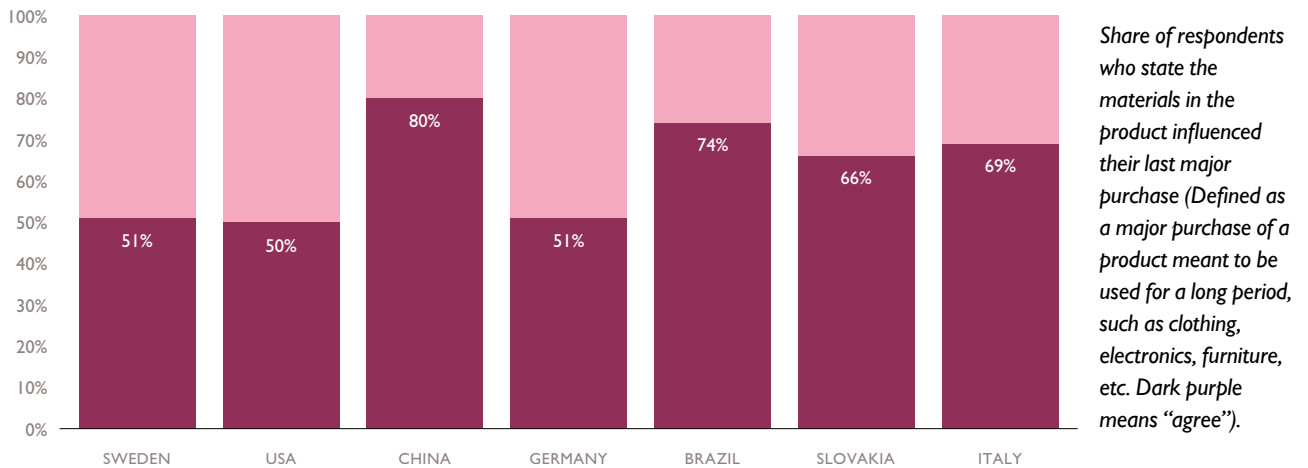
## WHAT IS NEXT?

While activism and responsible consumption are slowly changing minds and behaviors, people are still expecting more to happen. So what do people suggest we do? Again, faith in collective solutions is limited. A mere 6 percent of the respondents suggest a higher tax on consumption should be imposed. Only 7 percent propose higher taxes on travel and transportation – one of the major sources of greenhouse gas emissions. About one in five consumers suggest higher tariffs on CO<sub>2</sub> emissions in general, whereas one in four respondents feel

that a ban on harmful substances would make a difference. More than anything, however, people seem to demand a solution that would facilitate action on an individual level. The single most appreciated measure in all countries surveyed, would be more effective systems for recycling materials. Even in Sweden, where only one percent of the waste ends up in landfills, more than 30 percent of the respondents would like to make material recycling easier and more efficient. Surprising? We think so. Is this a bias for recycling?



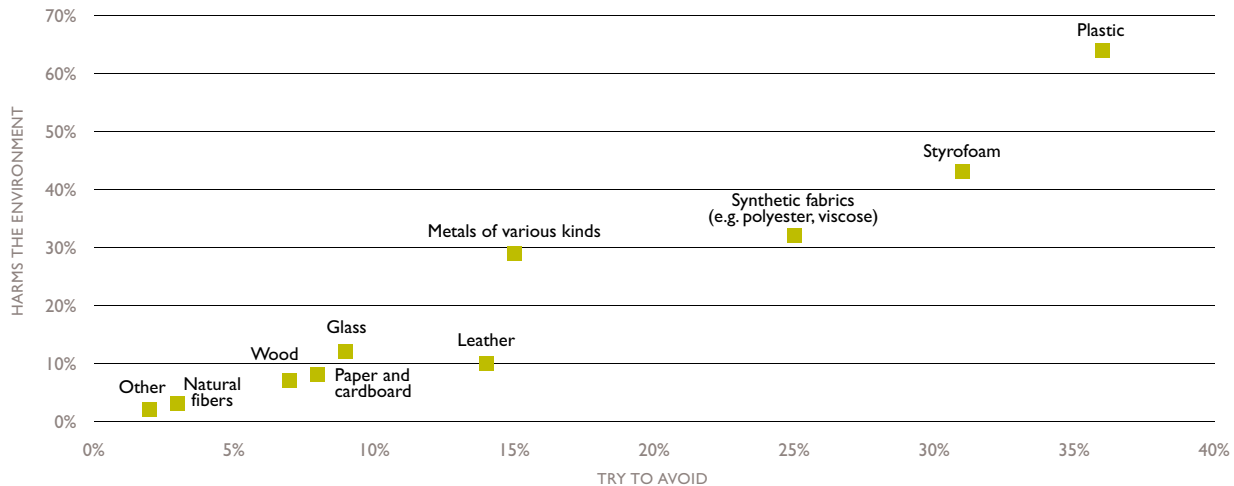
Are you worried about dangerous chemicals in...? Share of respondents that say they are “very worried”.



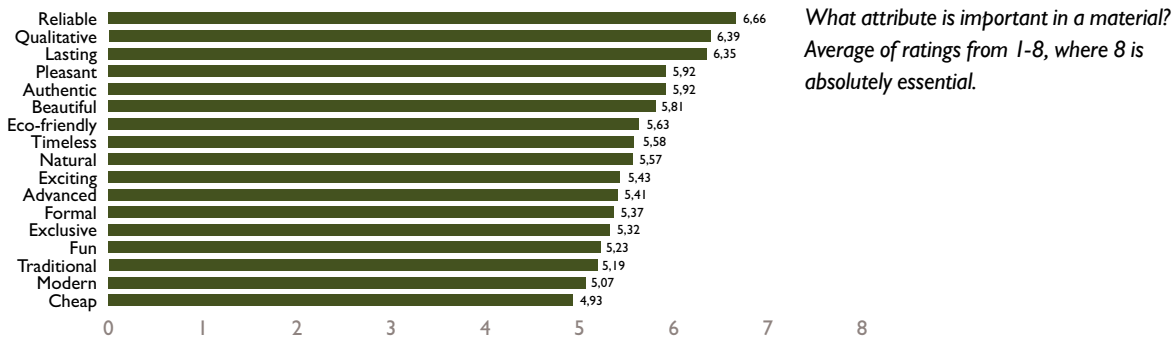
## MATERIAL MATTERS

Like the ingredients in a meal, materials define the quality, look and feel of every product we buy. Is it rustic, exclusive, sporty or cheap? The material can make all the difference. But it isn't a science. What truly matters are our individual bents and preferences. It turns out that in Sweden, material is less of an issue than in the emerging economies of China and Brazil. According to the survey, 51 percent of Swedes claim the material played a role the last time they made a significant purchase. Slovakia and Italy share a common ground at 66% and 69%, respectively. Interestingly, the corre-

sponding share in China and Brazil was over 70. We asked our respondents question regarding our views on chemicals and toxins. In our 2016 survey (Sweden, Germany, USA, China, Brazil) a near majority of the people surveyed were worried about the occurrence of chemicals in food and cosmetics and the people of China and Brazil stand out in that they are substantially more inclined to have such concerns. When we extended the survey to Italy and Slovakia, we were surprised to see that Slovaks and Italians top the ranks for worrying about chemicals.



*If it harms the environment, then we avoid it.*

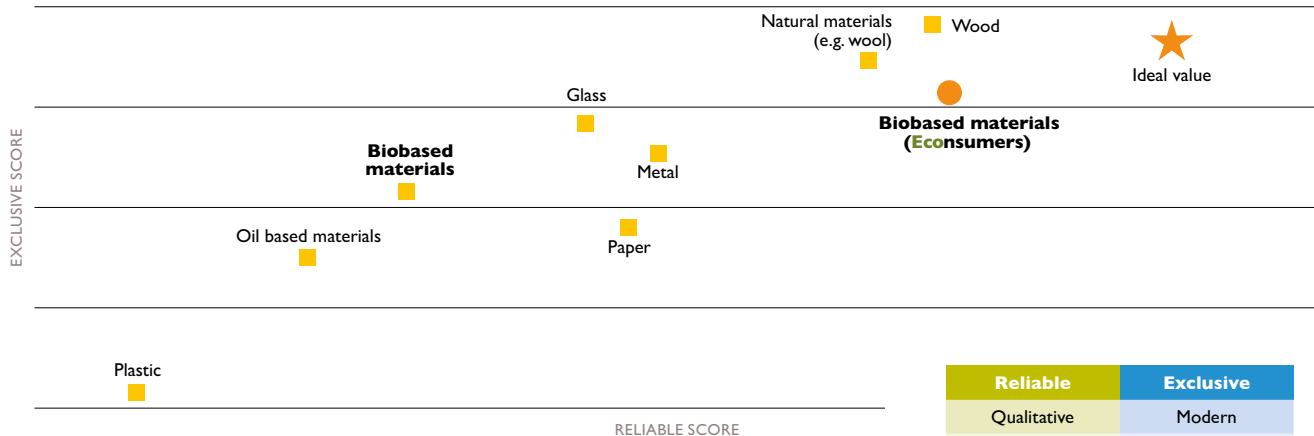


### BAD NEWS FOR PLASTICS

With this in mind, what do people want from a material? When asked what they think is important, respondents favored properties such as reliability, quality and authenticity. Properties such as “inexpensive” or “fun” were viewed as less vital, with the exception of Italian and Slovakian respondents’ preference for “inexpensive” materials. When subjecting the respondents’ preferences to a multivariate analysis, it turned out that two main groups of attributes – reliable and exclusive – explain to a large extent how people interpret and rank the properties of materials. Plotting the results along two axes, it is evident that plastics are in trouble. The survey clearly shows that when people are asked to list materials that they perceive as both reliable and exclusive, the fossil-related materials

upon which modern living has been constructed are not at all appreciated. On the contrary, a majority of the respondents think plastics harm the environment and consequently try to avoid the material in the first place. So, what does come to people’s minds when they are asked to consider materials that are both exclusive and reliable? The answer is natural materials: Wood, wool, cotton and linen, materials that are renewable and in one way or the other derive from nature’s own “smorgasbord”. This, you’d think, is also good news for biobased materials in general – the things we can extract from plants and trees. They are all natural and full of potential. Yet, as is often the case, reality turns out to be more complicated than one would at first assume.





Wood and other natural materials are highly ranked when it comes to reliability, exclusiveness and pleasantness. Bio-based materials are considered exclusive and pleasant, but not very reliable compared to other materials. While regarded as more eco-friendly than oil-based materials, they are viewed with some skepticism and occupy a middle ground between oil-based or “chemical” materials and materials that are perceived as “natural”. Econsumers support bio-based materials to a much larger degree.

Reliable	Exclusive
Qualitative	Modern
Lasting	Fun
Authentic	Exciting
Pleasant	Advanced
Timeless	Formal
Eco-friendly	Traditional
	Beautiful

Qualities are divided into two attribute groups, within which the qualities co-vary, i.e. it is likely that any material perceived as “reliable” or “exclusive” also has the other attributes in its column.

## A CRY FROM THE WOODS

Interestingly, when studying consumer preferences from this vantage point, biobased materials modestly find themselves between oil-based materials and glass. In other words, in the eyes of the average consumer the materials that we can extract from our forests are not perceived to be particularly reliable or exclusive. Why is this? Do biobased materials simply fail to meet the standards of today’s consumers? Or have the proponents of a biobased economy failed to make the case? It can be argued that biobased materials do have quite a few advantages. It transpires that cellulose, the building block for all trees and plants, is more rigid than Kevlar – you know the synthetic fiber used to make bullet-proof vests. In certain states, cellulose is also stronger than glass fiber. Above all, this nifty little natural product, the most abundant renewable organic matter on this earth, can be modified and manip-

ulated in ways that may well make our addiction to fossil resources a thing of the past. One would think that consumers would be absolutely enthusiastic about the prospects for cellulose, but evidently they aren’t. However, a closer look reveals that opinions differ widely. The survey shows that a certain group of “Econsumers”, respondents who are particularly concerned about the environment, are much more appreciative of the perceived qualities of biobased materials than the average respondent is. As a matter of fact, when included in our multivariate analysis – their preferences plotted along the same two axes – Econsumers actually think that biobased materials pretty much beat everything else. From the point of view of a resource-scarce economy, this is both an opportunity and, as will be shown, a huge challenge. How can the values of a more bio-based economy be communicated?

## CHANGE IS FRIGHTENING

So, here is a problem: It has actually been known for decades that cellulose is a natural resource packed with opportunity. However, for reasons we needn't dwell upon here, society once chose to rely on other resources, and that has remained the case ever since. Now, if we are willing, the time is ripe for a major change. Incentives are in place, technologies have evolved. What are we waiting for? But then of course, people don't like change.

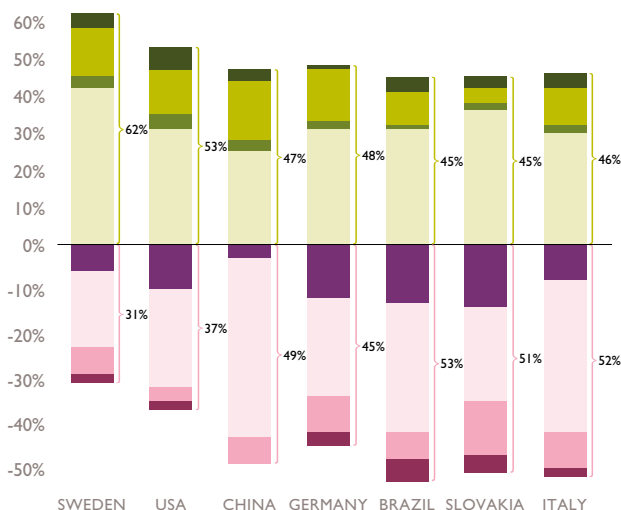
One of the scenarios explored in the Global Outlook was one in which innovation and entrepreneurship finally triumph over the political and macroeconomic turmoil of the 2010s. As such, the respondents were asked to react to the description of the following future scenario:

*"Imagine a future in which raw materials from the forest are used to manufacture a variety of products – everything from textiles and automotive parts to cosmetics and prosthetics. This implies that the forest will be a more important resource in the manufacture of materials and products in which we currently use oil, plastics, glass and metals."*

The respondents were then asked to choose from nine different answers to describe their feelings. Three were overwhelmingly positive, and one cautiously positive. One answer was indifferent and one cautiously negative, whereas three of the answers were overwhelmingly negative. So what did people say? Well, it turned out to be a fairly polarizing issue. Generally speaking, a slight majority of the respondents were on the positive side. Swedes particularly so, with 62 percent of the respondents claiming to be either "happy" or "curious". However, as promising as such a future may sound, many respondents still turned out to detest the thought. In Brazil, a majority of the respondents replied that they were either "worried" or even "upset". A very similar distribution can be found among Italian and Slovak respondents. Some respondents even claimed they would take the matter to the streets. Or, in the words of



- Committed to helping, I'd want to speed this development along
- Happy, it sounds like things are shaping up
- Relieved, it'd be a relief that this is happening
- Curious, it sounds interesting but I would like to know more



- Disappointed that such a thing could be allowed to happen
- Worried, I don't think such a development would be good
- Upset or irritated with this development
- Really angry, I would take to protesting in public



*a Brazilian student, I cannot imagine such a devastating scenario, probably no one would exist to tell the story.*

In the final analysis, some people live in cities, some live closer to nature and some even live directly from nature. So our attitudes obviously differ accordingly. When Swedes, Americans, and Slovaks are asked to think about the forests, for instance, they think about freedom, nature, trees and recreation. Respondents in China, Brazil and Italy, on the other hand, think about air. Needless to say, these differences shape how we look upon a future in which the forest, more than ever before, is becoming a heavily exploited natural resource. Whereas respondents in Sweden react positively to the prospects of a biobased economy, respondents in China and Brazil are far less enthusiastic.



## **SEEING IS BELIEVING – THE NEED FOR A DEMONSTRATION ECONOMY**

So, it seems we find ourselves subject to a classic yet illusory dilemma. Needless to say, people want to stay healthy, and they want – at least to a varying degree – to preserve the more intangible values of the natural world for future generations. However, there are evidently still large groups that would be reluctant to see a society that realizes the full potential of our forests, even if that in turn would make for a more sustainable global economy. This is a challenge. In the end, brands and policies live and die by the preferences of the people. It also means that are we to make way for a biobased economy, if that is what we want, people must be convinced of the benefits. Simply put, a biobased economy must be in demand. Enter the demonstration economy.

We still don't know what lies ahead. But we've tried to imagine, among a range of possible scenarios, one

future in which societies and economies become increasingly diverse and fast-changing. It is a world which is far from free of challenges and threats, but one where new and rapidly evolving technologies create great opportunity. This, we believe, is also an environment in which traditional ways of doing business become void. To succeed, corporations, policymakers or anyone with a view to sell a product to the masses will have to move beyond crafting ideas and concepts. To succeed, i.e. to alter minds and preferences, the benefits of change must be wrapped in more than snazzy PowerPoints or visionary words. Rather, the benefits must be felt, smelt and seen, and successful organizations will have to develop an ability to actually demonstrate where they are heading. We call this the demonstration economy.

## A CELLULOSE-BASED SOCIETY

“A Cellulose-Based Society” is RISE third Global Outlook, which was published in 2016. “A CelluloseBased Society” focused on the conditions for a vital social transformation – from a fossil-based and linear society where products are produced, used and then thrown away, to a biobased and circular society where “waste” as we think of it today will not exist and where all material will find a new use once it has served its initial purpose. A Cellulose-Based Society highlights the conditions for any such transformation through the results of the comprehensive international survey outlined in

this publication, trends affecting development in key areas, and future scenarios that describe various outcomes based on an analysis of crucial uncertainties.

Curious about the full report?

Get your copy from:  
[www.acellulosebasedsociety.com](http://www.acellulosebasedsociety.com)



## ABOUT RISE RESEARCH INSTITUTES OF SWEDEN

RISE is the Swedish Research Institute and innovation partner. RISE is an independent, state-owned research institute that offers unique expertise and about 100 testbeds and demonstration facilities, instrumental in future-proofing technologies, products and services.

[www.ri.se](http://www.ri.se)

## ABOUT FACULTY OF FORESTRY TUZVO, SLOVAKIA

Faculty of Forestry at the Technical University in Zvolen (TUZVO), Slovakia, is dedicated to enabling young generations in the fields of adaptive forestry, wildlife management, and bioeconomy. Both domestically and internationally, it makes a substantial research contribution towards protection and creation of Adaptive Forest Ecosystems and Forest Ecosystem Services Flows.

[www.tuzvo.sk/lf](http://www.tuzvo.sk/lf)

## CHARMED

is a H2020 MSCA-RISE-2016 project, grant agreement No. 734684, carried by an international consortium of academia, industry, non profit, and public sector to harness green environment & infrastructure potential for human health and well-being.

## ABOUT KAIROS FUTURE

Kairos Future is an international consulting and research company that helps businesses and organisations to understand and shape their futures. We provide our customers with the big picture using trend and business intelligence analyses, innovation and strategy.

Read more about us at [www.kairosfuture.com](http://www.kairosfuture.com)

RISE Research Institutes of Sweden  
Box 5604  
SE-114 86 Stockholm, Sweden  
Tel +46 8 676 70 00  
Fax +46 8 411 55 18  
[www.ri.se](http://www.ri.se)

