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MY PLANET

by The Navigator Company

LOOKING BEYOND THE UNCERTAINTY

What if the uncertainty in which we live can power us out of our comfort zone and awaken the best in us?

We listen to a host of experts in different fields, to find out how to deal with a changing world.

Now as never before it's vital for us to set a course, pull together and stay focused on our goals.



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Surgeon

Helena Freitas
Teacher and researcher

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Clinical psychologist
and coordinator of
the Psychology &
Performance Action
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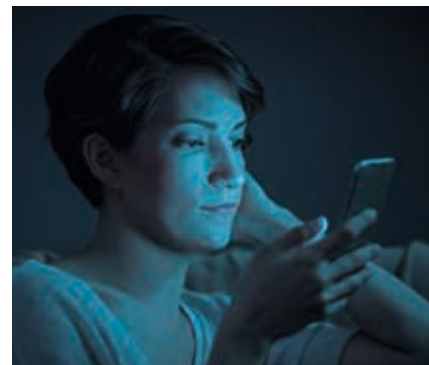
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A journey beyond uncertainty

In the past three years, unexpected events, such as the pandemic and the war in Europe, have joined our global concerns about climate change and put added pressure on the daily lives of individuals, society, and organisations. We are living through unsettled and confusing times, but the march of time is unrelenting. And it challenges us to look beyond our immediate uncertainty. And to continue planning for the future and preparing for tomorrow. So, this edition of My Planet is as special as the historical moment at which we find ourselves. It starts with an unpublished essay, especially commissioned for our magazine, in which José Luís Peixoto reflects on the uncertainty of our lives. It then continues in three main chapters. In the first, **1. “Why do we feel exhausted?”**, we explore mental well-being and health, and offer tips on how to cope with a fast-changing world. In the second part, **2. “How can we save the planet”**, we broaden our focus and look at the problems affecting the planet, how they affect us and what we can do to be part of the solution.

In the last of the three chapters, **3. “Can uncertainty power prosperity?”**, we talk about social and businesses issues and show how uncertainty has the potential to convert a crisis into an opportunity.

We do all this from the perspective of dozens of individuals who shared their experiences with us. The conclusion we reached is that each of us is more than a match for the challenges we face and that, as a species, resilience is written into our DNA. And because My Planet is a The Navigator Company project, we also report on how the organisation has stood firm in the face of instability, responding with innovative products, investment in human capital and a clear commitment to sustainability as a whole. These troubled times are not the first great crisis that the world has faced, and will surely not be the last. We can't choose the era in which we live, but we can choose to embrace the age to which we belong and to do our best to rise to the challenges. Trusting and investing in the future. Of people, the planet, and businesses. ●

A special edition, with 120 pages packed with stories that show that it's our attitude, as individuals and as a group, that determines how we experience uncertain times. This is why we draw inspiration from ants, and from their work ethic and intra-group cooperation. Alone, they are defenceless, but together they are unstoppable.

Every comma is a question mark

After everything that has happened, we now have the chance to learn a little more about the past. Before, when we were teenagers or younger, we could be impatiently dismissive, but now, at last, we are able to understand that, just as we are here today, people in the past have been here too. We are able to recognise the uncertainty they experienced because that experience is also ours. Before, we were tricked by the chronology. We would observe events through to their conclusion, after the event, and we could downplay the troubles of the past because of how it turned out in the end. In a single history lesson, we learned when the war started, and when it ended. We didn't realise back then that the person living through the war, at the centre of all that destruction, only knew it had started, and had no way of working out when it might end, or if it would ever end. In our rash juvenile judgment, we satisfied ourselves with the idea that, if it had started, it would later end. We forgot that the most common outcome of wars is not having an end. We thought about the past in the same way that we watched a film. At the inevitable happy ending, we are confident that all the dangers faced by the characters had been worthwhile. But in life, testing times are always uncertain. Looking back, we err in our assessment of the anguish this causes, because we need to imagine it. So now that we too have experienced the awesome shock of uncertainty, we can learn a little more about the past. The difficulties that our parents told us about, and that seemed insignificant to us, the challenges faced by foreign peoples in centuries past, or the challenges that our neighbours face this morning, all these are uncertainty. We accustom ourselves too easily to the impossible. We pay attention to details, mere specks of dust on the surface of time, because we believe that the essentials don't change. We go to sleep every night confident that, the next morning, we will open our eyes on the same world. This is a belief we never explore, it exists silently, like a backdrop to our thoughts. Lulled by this conviction, never put into words, we forget that our phone can ring at any moment, the doctor may look us straight in the eye, we can turn on the TV and the news will be talking about us. We

by José Luís Peixoto, writer

can go outside and, suddenly, everything changes. Right now, there's something of a silence around us. This is the absence of any such sudden disruption. At a moment like that, someone or something comes knocking at the door, and the silence is over. Certainty is a misunderstanding. We shelter under it, we are like madmen living their lives inside an invisible house. We focus on our daily tasks, like dutiful children, and fail to see the invisible walls that shelter us, ready to crumble at the onset of any storm which, for reasons it doesn't need to share with use, decides to destroy us. Yes, yes, it might happen, but it won't happen, we reply smugly. And we are scornful of anyone who bothers us with unwelcome reminders. It might happen, we know it might happen, we've been told so often, it's been explained in every way imaginable and stated in the clearest terms, but it won't happen. Deep inside us, because it hasn't yet happened, we believe unquestioningly that it won't happen.

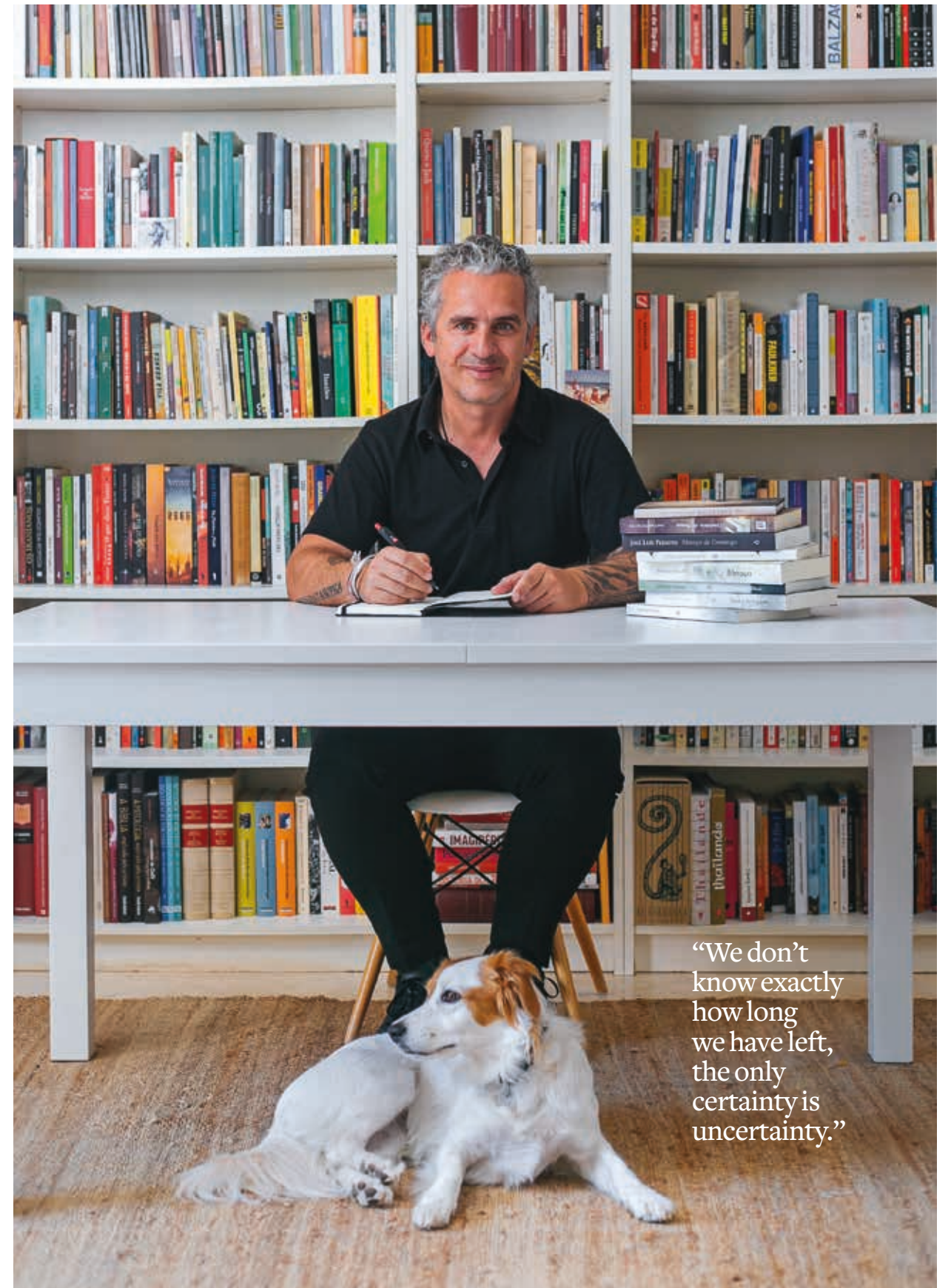
Uncertainty is something that, explicably or otherwise, upsets this whole mechanism, a gear that comes out of contact with the other wheels. It is the moment when, out of the blue, we think: and what if it actually happens? What if the thing we've been told about so often, explained in every possible way, spelled out in absolute clarity, what if it's about to happen? There is a winter that only exists at the instant of this realisation. When the walls of the invisible house vanish, the cold leaves us numb.

I haven't yet used the word, but yes, I'm talking about death. And I'm talking about living, with plans for tomorrow, for

**Certainty is a misunderstanding.
We shelter under it, we are like madmen
living their lives inside an invisible house.**

next week, for next month, for two years' time, for a period of time we don't want to pin down completely, and I'm talking about dying, about those plans ceasing to be valid, like forged banknotes seized by the police. Reduced to its essence, that is what uncertainty comes down to: being alive, knowing we're going to die, and not knowing when. In other words, being in one situation, knowing it will end, but not knowing when. It might be at the next comma, the one you just read. But no, it turns out we are still here. But it could still be at the next full stop. Again, it wasn't. But it could be in the middle of a word, any word. Or at the end of a paragraph.

Living and dying, so raw. We are flies swarming around light bulbs on a summer night. Although we consider ourselves superior to flies, and don't want to be compared with such tiny insects, this assertion is much less metaphorical that we are prepared to believe. It won't be long before we too are people from the past and, with time, we shall see our uncertainties belittled by smart alics who just happen to be alive, adolescents of any age. We don't know exactly how long we have left, the only certainty is uncertainty. ●



“We don't know exactly how long we have left, the only certainty is uncertainty.”



1. Why do we feel

EXHAUSTED?

Events overtaking events at dizzying speed, so fast we hardly have time to take them in. And if at a global level everything seems uncertain and unpredictable, it's easy to feel the same in our hearts and minds. But there are strategies for coping with this.

Ana Bispo Ramires, psychologist

“We are biologically programmed to react to uncertainty with anxiety”

The disruptive effects of the pandemic, armed conflict, ever higher levels of addiction to information technology... A complex picture, with consequences in terms of emotional exhaustion. Ana Bispo Ramires is a psychologist who has tips for preserving our mental health in uncertain times.

“**A**nxiety is a normal response to an uncertain world, it's to be expected, as we are always trying to find the control switch and want our daily life to be as predictable as possible”, explains Ana Bispo Ramires, a psychologist and coordinator of the Psychology & Performance Action Group (GAPP). In her view, anxiety itself is not a problem, as long as we learn to cope with it and to use it to our advantage. It turns out that we don't all react in the same way to the newfound uncertainty in our lives. “Our surroundings are just a pointer, a piece of data or information to be considered; what each of us then does with that information is completely different from one person to another and depends on the psycho-emotional resources we possess as individuals - this will determine whether we overcome the situation more successfully (or not) and with less (or more) psychological suffering”, she confirmed. “We know”, she goes on, “that continued exposure to stress factors can lead to situations of post-traumatic stress, when people's resources are exhausted, from having continually to adapt, and from the resulting external emotional pressure. We see this clearly with the pandemic, a period in which we had a worsening of clinical issues, in psychiatric terms, and in dealing with levels of psychological suffering.”

Emotional literacy

The pandemic, and now the war, have merely exacerbated a key characteristic of the Portuguese as a population: “a worrying disconnection from our emotions”, explains Ana Bispo Ramires. “As we are already a population with scarce psycho-emotional resources - self-awareness, to be able to recognise what we are feeling, and self-regulation, to know how to cope with this emotion -, because we haven't nurtured them, because our schooling does not systematically provide us with this learning and because, too often, we turn to mental health specialists when we're already at crisis point and not preventively, to learn skills, factors of uncertainty only make this situation worse. So, what we have seen with the pandemic is that, both

“Teachers, training officers and the leaders of organisations are the people who mobilise change, who can create settings of psychological security.”



- Degree in Clinical Psychology from ISPA.
- Master's degree in Sports Psychology from the University of Minho and has the specialties of Clinical and Health Psychology, Employment and Organisational Psychology, and the advanced specialisation in Sports Psychology.
- Coordinator of GAPP and head of Psychology services for the Portuguese Olympic Committee, since 2017.

at individual level and in families, organisations and society, those who were better equipped to start with have come out best. In other words, by using their resources of resilience, they took advantage of the instability and uncertainty to come out better than they were before. They made the situation work in their favour, to get ahead.”

“The situation now is not very different”, she continues. “We hadn't yet taken our masks off when the war arrived. Things are highly unpredictable, prices go up every week. We're talking again about a situation in which the emotional resources of individuals, families and organisations are going to be stretched - and we don't have many resources to start with. We need to invest in people's emotional literacy. This is true for state organisations, but also for businesses, if they are to be sustainable in terms of human capital and equip their workforce with the skills that school and university fail to teach.”

Mental health is reflected in every aspect of people's lives. If our psycho-emotional well-being suffers, we have trouble performing our roles as wives or husbands, mothers, fathers or children, friends, employees or boss. But she explains, in these uncertain scenarios, “we always benefit from some other part of our life which is stable”. Having stability in our marriage or feeling supported by our family, having a secure job, in a well-established company that invests in ventures and in people, all this helps us to “navigate” the current sense of uncertainty - “so it's important for people to accept their own 'share of responsibility' and to invest deliberately, positively and systematically in the different areas of their lives.”

The power of resilience

The times we live in are uncertain and sometimes startling. Ana Bispo Ramires makes no bones about she thinks: “We have to look for what we can do with this, we have to understand what we can do to change, to do better, to improve our abilities as the moment strikes. This is one of the principles

of human resilience: if I can't change this situation, how can I use it as a stepping stone? We have to look inwards at ourselves. And instead of getting sidetracked in complaining that the stage is sloping, we have to find out how we can dance on this uneven stage.”

“Culturally speaking, there is also a great misunderstanding here”, she says. “We talk about negative emotions as something to run away from, when that's not the case: we have to be prepared to ride the negative wave, to connect and live with the negative emotions, in order then to know what resources we have to activate to get out of the negative (with the important learning that brings) and into the positive. It is negative emotions that have the potential to catalyse, to connect us to the parts of ourselves that are not functioning well and to enable us to change them. And that's how we grow.”

A marathon

Mental health, says Ana Bispo Ramires, is an issue like climate change: it will take generations to correct. “It won't be us - individuals, families, organisations - who will reap the rewards of resolving it, but if we don't start to sow the seeds, nothing will happen in 15 or 20 years' time. It's the same as other transgenerational endeavours, where the initial responsibility is to be sufficiently selfless to allow someone else to actually 'inaugurate' whatever it is; it's a matter of laying the foundations so that we can eventually have a society with better mental health indicators in future”

For the tricky moment we are living through, positive thinking is good, but uncertainties won't be resolved with wishful thinking and mental health is not all sweetness and light. “We won't say 'everything's going to be alright', because in all likelihood things will get even worse than they are”, Ana Bispo Ramires concludes. “But sometimes that's how it is, a major crisis brings learning and opportunities on a large scale. We have to be focused on ourselves, in the positive areas of our life, and on everything we can do to improve things.” ●

“We can’t change what’s happened to us, but we can decide what to do with it”

Salvador Mendes de Almeida looked for the inner strength to overcome the barriers of everyday life. What he’s done in the past 24 years bears witness to this personal journey, that he decided one day to expand into something bigger, that made sense for the community. He believes that solidarity between people is more fundamental than ever in a world in upheaval. “I see people around me who don’t believe that anything will change, who don’t believe in anything. And that’s sad and worrying”, he says.

A motorcycle accident changed the course of his life. Salvador Mendes de Almeida was just sixteen when he lost the use of his arms and legs. The journey he has travelled since then, to being someone who today says, without hesitation, “I’m a happy person”, has borne little resemblance to the plans and dreams of the youngster who loved to travel, play rugby and football, ride horses and his motorcycle and enjoy life with his girlfriend. But the outcome, in what really matters, might not have been very different. At the age of forty, he is the director of an association that has changed the lives of thousands of people - something he says helps him to “sleep better” -, he’s married, has a daughter, sails a specially adapted boat, and has plenty of plans for the future.

“Everything was the same, except me”

After the accident, he lived through fear, discouragement, and periods of

terrible strain. And three uncomfortable encounters with his new reality. The first was in the hospital where he stayed for the first phase of rehabilitation, in Spain. “A doctor came to see me and we had ‘the conversation’. He explained that I would have to rebuild my life and that a wheelchair would always be part of it. That he couldn’t say if I would ever walk again. And that I couldn’t count on it - the important thing was to fight to recover as much movement as possible through the physiotherapy”, he remembers.

The conversation took place about a month after the accident. Until then, Salvador had believed the situation would be temporary. “It was a very, very difficult moment, one of the hardest in my whole life, but these conversations are important for us to ‘come down to earth’”, he explained. “What came next was a very complicated period of acceptance, but one when I had a lot of help, from doctors, family, physiotherapists and friends giving be fundamental support”, he recounted. The second great confrontation with



“Solidarity can help to build a better and more inclusive society.”

reality was when he went back home and to school. Actually, he never really went back home. “We had to move, to somewhere with better access. And I also had to adapt to school, where everything was just the same, except me. Where I spent 40 minutes dying of heat until I found the courage to ask someone to help me unzip my jacket. And where I depended on the notes of my fellow students in order to study”, he recalls.

In these early days, physiotherapy was a new addition to the routine that Salvador strove to re-establish: “I tried to do what I did before, all the same. I went to see all the rugby matches, I wanted to be with my friends, with the team. But then it was painful not being able to play. I remember eventually realising that it wasn’t good for me to be there. Not being able to play was too much of a frustration. And it was only then that I started to move away from my previous world.”

In this process of accepting an unknown reality and searching for a new identity, the third moment that marked him happened about two years after the accident. He had travelled to Italy, accompanied by two helpers, for a three-month rehabilitation programme.

Far from his parents, on the brink of adulthood, his fears and uncertainties mounted up. Going back in time, he remembers the unanswered questions continually spinning around in his head: “Will I ever be able to live alone? Will I ever have a girlfriend again? Will I always need someone to help me all the time? Would that be a problem?”.

It was by watching the people around him, attending the same programme, that he arrived at a clear answer: “I saw that some managed to lead their lives very independently, whilst others were completely dependent. And this wasn’t necessarily a question of their physical limitations. I realised there were two possible roads I could follow: either I did everything I could to be able to face this reality, or else stay dependent on my parents and others for the rest of my life.” The first of these became his certainty: “I realised that my level of dependency would depend on my



Associação Salvador

Since 2003, Associação Salvador has worked to ensure all people with any kind of motor disability or reduced mobility are able to enjoy choice and independence in their lives. In the job they dream of, in the outings they enjoy or going out for meal, or in the sport they want to take up. Knowledge, Integration and Awareness Raising are its main areas of work, dividing into a host of different programmes. To help and sign up as a “Friend of Associação Salvador”, [visit the website](#).



mental and psychological strength and my ability to ‘fight’ for myself. I came back from Italy with the sense that I couldn’t carry on as I had before. I’d really woken up to my reality.”

Mental strength and meaning

After 24 years of physiotherapy, which he has continued to do even after stabilising his physical condition, Salvador Mendes de Almeida stresses that it’s not just the body you have to work on. Mental strength and self-knowledge are crucial and very often also need to be built up when a person faces their new reality as a person with reduced mobility. “In most cases, psychotherapy is highly advisable, because the psychological toll is enormous”, he says. “I had therapy systematically for several years, and still go today when I need it. I’ve no doubt it’s helped me and still helps me a lot”, he tells us. “It’s enabled me to find and use my mental strength to the best advantage. And to go on a journey of self-discovery, which is very important”, he adds.

Faith is something else he tells us has helped: “I don’t ask God why

“I’m an open person, I don’t have a tendency to isolate myself and I’m persistent. I don’t give up at the first hurdle, or at the second, or the third. Sometimes we have to reset our course, but I do my best to ‘continue straight on’. These are things that have helped me get through the most difficult times.”

this happened to me. I ask what it happened to me for. What can I do with this? When we feel most discouraged, we tend to see ourselves as victims and to be very focussed on ourselves and on our problem. But we have to try to move beyond that. We can’t change what’s happened to us, but we can decide what to do with it.”

In Salvador’s case, the answers came very quickly: “The opportunity that my father gave me by setting up the association became more and more the centre of my life. Helping people who are going through what I went through, being able to help smooth their way, it ended up making complete sense. We understood there was a lot of work to be done to combat the isolation that these people experience. And having today an excellent team of 22 co-workers makes me feel really fulfilled. It wouldn’t have been possible alone.”

Uncertainty and the uphill battle of everyday life

The hope that one day there might be a cure is real, but it’s no practical help. In reality, uncertainty is what you have to expect. “For a disabled person, uncertainty is there all the time. It’s not the future that’s uncertain, it’s the present, your everyday life”, explains Salvador Mendes de Almeida. His electric wheelchair weighs 200 kg, so it’s not easy to transport. When there’s no disabled access, he may be prevented from entering venues of any number of professional, social, leisure or other events. “We have to plan everything in detail”, he says. “If I go somewhere new, I have to find out about a list of factors beforehand: get measurements of the lift, what the pavements are like in the area, whether

my chair will get through the doors. If it won’t, think of a plan B: is there someone strong enough to get me into a manual wheelchair? Will that person be able to push my manual wheelchair? I always need these back-up plans. They’re part of my life and you reach a point where it’s a strain”, he confesses. So, in order to cope with the uncertainty of everyday life, he has become more careful and doesn’t leave things to chance. “Sometimes people say ‘there’s a step here, it’s not high, I’ll give you a help’. I don’t take risks. I only go to places I know or where I have an assurance that everything will work. For me, a 5 cm step is like a 2-metre wall for people without mobility issues. I can’t get over it.”

In a country where disabled access is still the exception and not the rule, staying at home, giving up on going out, is the natural solution for many. Salvador offers his advice: “Be careful, but don’t stay at home. Don’t give up on demanding your rights. We have to demand that the municipal authorities, who have the relevant powers and responsibilities, create solutions so people with limitations can lead an active life.”

In his opinion, the greatest barriers to faster change on the issue of disabled access are above all psychological and a question of attitude: “There’s a lot of resistance, it’s all very slow. And not because only a few people are affected. In Portugal, 8 to 10 per cent of the population have some sort of disability. We’re talking about a million people. More than half of these have some sort of motor disability. The law on disabled access has existed for 20 years, but in practice things don’t change, and everything is very slow.”

Solidarity is strength

In a globalised society, where crises in one area inevitably impact others, solidarity and hope are more important than ever before. At a time when the pandemic, the war and climate change make the future look bleak, Salvador Mendes de Almeida has no doubt that “the great challenge of our time is to achieve a constructive dialogue between countries, governments, and communities, but also between the members of a society. It has to be the same spirit. If we don’t have serious and responsible dialogue, we’re on our way to ever greater despair and scepticism. I see people around me who don’t believe that anything will change, who don’t believe in anything. And that’s sad and worrying”, he says.

On the other hand, he points to an urgent need to transform our cities: “Transforming them to make them friendlier to people and the environment. In other words, making them more accessible to people with reduced mobility and better prepared for climate change, so that people drive less, consume less, and pollute less.” Because the more vulnerable are the first to be hit when times are tough, there’s also an urgent need to learn “not to feel we’re alone, and to look the other way, instead of at ourselves, realising that there’s always someone worse off”, he says. “We can all help someone else, whatever our situation in life. Of course, people who are better off will find it easier to help, but problems aren’t all solved with money. Often, help can simply take the form of talking to someone. Solidarity can help to build a better and more inclusive society”. ●

Clicking off to stay on

Digital technology and the internet have come into our lives to stay. They entertain us, bring us the news and help us in countless ways. But we need rules on their use, in order to face up to the risks. The more we click on the “off” button, the more our real-life stays “on”.

People in Portugal spend an average of 7 hours and 56 minutes of every day online. In this screen time, 2h28m are spent on social media and 38 minutes playing games. The figures are from the “Digital 2022” report from Data Reportal, which also tells us that our time online is divided between 4h22m on a computer or tablet and 3h34m on a mobile phone.

If we stop to think, these numbers are astonishing. It’s almost eight hours, a whole third of our day. It’s half our waking life. ‘But it includes the time we’re working, which for many of us means being always online’, some might say. So, we’ll give them the benefit of the doubt and look just at the two and a half hours we spend

each day on social media - by the end of the year we have spent 38 whole days scrolling through the profiles of friends, acquaintances or celebrities, clicking on like, sharing photos of the sunset and videos of cats. These are 38 days we don’t spend talking to our family and friends, playing with our children, establishing real relations, walking in the countryside, reading a book, or two, or three...

Our screen time has increased exponentially, also as a result of the pandemic. But, “irrespective of whether we’re working, on social media, watching a video or playing a game, this time needs to be rationed. Because there are actually a number of risks”, says Filipa Jardim da Silva, clinical psychologist and founder of

Technology affects sleep quality, with consequences for our cognitive functions, memory, immune system and emotional stability.



Academia Transformar. “It’s not a question of demonising technology and the online world”, she points out, “but rather of alerting people to good practice and the care to be taken in using it”.

Virtual addictions, real risks

“Tech has advantages, but not just advantages”, is the view of the neurologist, Martin Lauterbach. “In general, we have to be aware that everything we do in life has a repercussion on the brain”, he explains. He therefore argues that “we should be careful about our ‘neurological diet’ and pay attention to what we ‘feed’ our brain”. Today, someone with unrestricted internet access, has access to everything. “And that can be dangerous”, he warns. “The internet has no code of good practice. We ourselves have to be informed to be able to filter and judge the content we access online”, he says.

Too much screen time can lead to isolation. “We can start to confuse the computer with our best friend and virtual interactions with real, live interactions in full colour”, explains Filipa Jardim da Silva. “The digital world easily puts us into communication with anyone, anywhere in the world, but we need to realise that this is no substitute for live interaction - our brain doesn’t trigger the same level of satisfaction and pleasure, hormonally, when we are online with someone or when we see them in person”.

The sedentary lifestyle is also a topic that comes up when we talk about overusing technology. “Screen time is time when we don’t move about, we don’t develop bodily awareness, we don’t truly stimulate our senses, and this has consequences in terms of physical and mental health”, she explains.

Something else that suffers is our



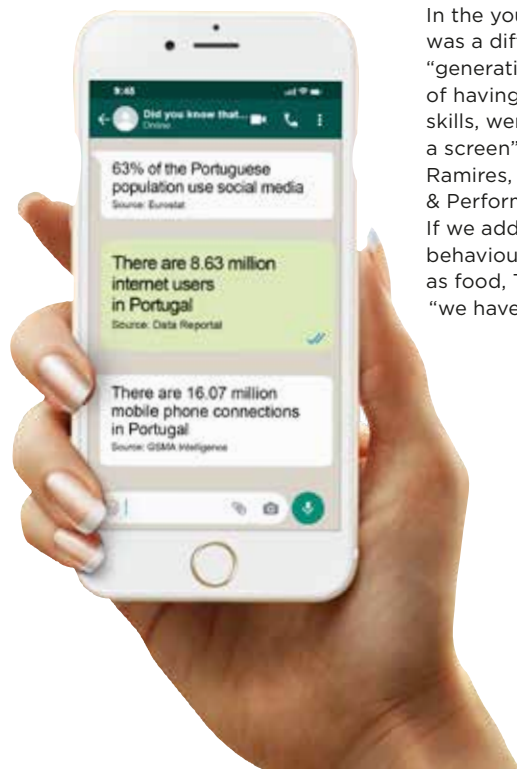
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Martin Lauterbach
Neurologist and
psychiatrist



sleep: “When the last thing we do before going to sleep is looking at our phone screen, when we wake up and our first instinct is to look at our phone, television or computer, this changes the quality of our sleep, with repercussions in terms of our cognitive functions, memory, immune system and emotional stability”, says Filipa Jardim da Silva.

Like a drug

Tech addiction is another risk when our screen time exceeds our non-screen time. “It works just like any other addiction”, explains Martin Lauterbach: “People are unable to stop, even when they know it’s harmful, and there are withdrawal symptoms, such as anxiety and restlessness”.

“There are people today who can’t live without a screen in their hands”, Filipa Jardim da Silva points out. “We’re realising there are certain phenomena, such as FOMO, or the fear of missing out, where people always need to know what’s happening on social media. People are afraid of not having a connection or their battery running down, and the first thing they ask before they go anywhere is whether there is WiFi. There’s also this need to be constantly connected, and there are cases where the person can no longer control it, meaning they can’t say no to the screen - they need the screen. It’s no longer a generational issue; when we’re in a waiting room or a metro station, we look around and it’s rare to see people without a screen in their hands, irrespective of whether they’re 15, 20, 35 or 55. You don’t need to have been born into this.” In the younger generation, the pandemic was a differentiating factor. These “generations of kids who, at a key stage of having to work their psychosocial skills, were locked indoors staring at a screen” are a concern for Ana Bispo Ramires, coordinator of the Psychology & Performance Action Group (GAPP). If we add to this the “index of addictive behaviours that people have today, such as food, TV or social media”, she says, “we have an explosive combination”.

FOMO: the constant
Fear of Missing
Out on what’s
happening online.



Virtual interactions can bring people together around the world but are no substitute for in-person relationships.

She explains: “If we think of addiction as an exercise in anaesthesia, where people gradually lose their emotions resources, we are involuntarily and unconsciously training ourselves to be less and less emotionally literate. It’s important that people should feel and talk, that they take responsibility and understand where they want to take their lives, their family, organisations and society as a whole”.

Age might not be just a number

Age doesn’t explain everything, but it can have an influence, as Filipa Jardim da Silva explains: “An older person, who didn’t grow up with all this, has spent a large part of their life in which their brain was protected against technological and digital over-stimulation. And that can be a protective factor. People who were born with technology all around face the challenge of being over-stimulated too early. For example, international

paediatric associations have clearly recommended that, up to the age of two, screen time should be zero, but we know that doesn’t happen: and it’s not through negligence, but because it’s totally impossible, in today’s society, to avoid a child having any contact with a screen”. Even so, “we can’t say categorically that people born in this technological generation will necessarily suffer more consequences”, she went on. “We’ll have to look at risk factors and individual protective factors, for the system to which that person belongs. For instance, there’s a difference between a child having some, highly rationed exposure to screens, where the adults around them are actively filtering the content, and a child who has free access to internet content.” In relation to the elderly, additional care is also needed. On the one hand, internet access can be help counter isolation. On the other, Filipa Jardim

Digital Eye Fatigue

Digital eye fatigue, also known as the computer vision syndrome, is the eye strain and disruption of vision that occurs after prolonged use of digital devices. The most common symptoms are tired and dry eyes, caused by the glow, reflections and variations in light. Concentrated use of a computer screen reduces the number of times we blink, altering the normal distribution of tears and increasing the exposure of the cornea. In addition to the times we blink, it’s also important how we do it: blinking less correctly (and screens lead us to do this) causes the eye surface not to be sufficient lubricated, which can reduce visual acuity and cause blurred vision.*

* <https://pubmed.ncbi.nlm.nih.gov/23538437/>

When our screen time exceeds our non-screen time, tech addiction is a risk.

“Electronic devices can be complementary, but they should never substitute paper, especially because of the sensory stimulation offered by paper.”

Filipa Jardim da Silva

da Silva explains, “it’s a resource that can tempt them to spend more time at home, alone, without moving, without having contact with nature, without stimulating their senses in other ways”.

Mental (de-)concentration

Nicholas Carr, author of “The shallows: what the internet is doing to our brains”, finalist for the Pulitzer Prize in the general non-fiction category, says that using the internet is like trying to read a book while you’re doing a crossword puzzle. “The internet is a medium based on interruption”, he argues. It has created new forms of communication between people and unprecedented access to information, but it has also made us lose our ability to focus on one thing, leaving us with chaotic and impatient minds, less able to think deep thoughts.

His idea, corroborated by several authors, is that, online, we enter an environment that promotes superficial reading, hurried and distracted thinking, and so our learning is also superficial. Because acquiring wisdom is associated with careful reading and solitary concentration and, according to Carr, “you won’t find much of that online”. In the article that inspired the book, Nicholas Carr writes that people don’t think like they did before. “I may feel this more strongly when I’m reading”, he says. “Immersing myself in a book or a long article used to be easy. My mind would be caught up in the narrative or the ins and outs of the debate, and I would spend hours ‘strolling’ through long passages of prose. Nowadays, that’s rarely the case. My concentration starts to fluctuate after two or three pages. I get restless, I lose the thread, I start to look for something else to do. I feel as if I were dragging my

rebellious brain back to the text.”

This can be problematic, according to Filipa Jardim da Silva, because “attention is a key skill for our broader well-being, for our mental health, and needs to be protected”.

Martin Lauterbach corroborates this idea, arguing that the lack of focus and attention encouraged by these digital technologies “is disruptive and counterproductive”, and that “this rapid change will definitely alter our habits of how we digest information”. The important thing, he stresses, is to adopt “tech hygiene”, allowing us to make use of the good things in the digital and online world, while minimising the risks. “It’s possible, but it takes a lot of discipline. We have to think very carefully about what we want from technology, and also be very clear about our values, to be able to combine these things satisfactorily.”

The problem with tech for mental health is using it wrongly, increasing the risk of addiction and potentially bringing out other disorders, such as anxiety and depression. Despite this, with some common sense and the right strategies it’s possible to have a healthy relationship with the digital and online world. For example, according to the study entitled “Taking a One-Week Break from Social Media Improves Well-Being, Depression, and Anxiety”⁽¹⁾, staying off social media for seven days is enough for us to recover a sense of well-being and to reduce symptoms of depression and anxiety. The research was conducted by the Department of Health at the University of Bath, in the United Kingdom, and found that, by switching off from social media during the week, the participants gained nine hours of free time, and that this contributed to their psychological well-being. ●



Back to basics

What can we do to balance the scales? “We shouldn’t forget our basic make-up as human beings”, replies Filipa Jardim da Silva, explaining: “We have a body and a brain, and we need to stimulate both of them. This leads us to a dimension of reality where it is important to touch things, feel and smell them.” Body-brain interaction is also singled out by Martin Lauterbach: “Tactile, sensory experience is essential. We’re more than just a brain. Writing by hand, for example, interacts with the comprehension and learning of words, precisely because it activates movement, motricity”.

It turns out that paper is an important stimulus: touching it, feeling its texture, smelling it... “Electronic devices can play a complementary role, but they should never substitute paper, because of the way in which it stimulates the senses”, she explains.

Despite these advantages, and all the others exhaustively demonstrated by science⁽²⁾ – showing paper to enjoy a clear advantage over digital media in reading comprehension, that writing by hand on paper makes for better retention of knowledge and increased brain activity, and that paper allows for better performance in learning and comprehension during primary education –, all the signs are that Portugal is preparing for to move all school textbooks online from 2025. According to the psychologist Filipa Jardim da Silva, this suggests we are not making good use of

technology. “Instead”, she says, “we’re starting to use technology against ourselves, considering precisely how humans function, how our emotions function, and considering our basic make-up as human beings, which impels us to use our body, stimulating movement and senses”. And, she adds: “To hear that all textbooks are going to be online leaves me rather concerned. Precisely because a developing brain, for example, that of a six-year-old, lacks the capacity to protect itself against this excessive screen time and this issue of over-stimulation”.

“There’s nothing that doesn’t leave its tracks behind in the brain”, stresses Martin Lauterbach. “So if we stop reading on paper, or writing on paper, our brain is certain to change. For better or worse, we don’t know, but it’s guaranteed to change” Technology doesn’t have to damage our physical and psychological health, but it inevitably brings challenges, and we need good practices to address these. It should be used to complement what we already have, argues Filipa Jardim da Silva: “It’s important not to abandon things that have always worked for us. For example, we shouldn’t imagine that an e-book can substitute a book on paper, or that a screen can substitute a sheet of paper. It’s important for it to complement things, and respect our culture and heritage, and our physical bodies, we need a balance”. ●

(1) <https://www.liebertpub.com/doi/10.1089/cyber.2021.0324>
 (2) <https://www.sciencedirect.com/science/article/pii/S1747938X18300101>; <https://journals.sagepub.com/doi/abs/10.1177/0956797614524581>;
<https://www.frontiersin.org/articles/10.3389/fpsyg.2020.01810/full>; <https://www.frontiersin.org/articles/10.3389/fnbeh.2021.634158/full?appule=137>

We are nature

Humans and nature are psychologically interdependent. This means human beings cannot be studied, or “cured” without the Planet. These are the principles of Ecopsychology, a discipline that calls for the restoration of a deep, therapeutic and natural connection.

Having originated in the 1980s and 1990s in the context of an interdisciplinary dialogue between Psychology and Ecology, Ecopsychology is based on the fundamental principle that we are a part of nature - we are nature. On the basis of this assumption, it explores the interdependence of human beings with the natural world, examining the implications of this for our identity, health and well-being. This enables us to take a fresh look at ourselves and the world around us, investigating our role in relation to environmental issues and promoting a way of life in harmony with an environmentally sustainable future. In other words, by stimulating direct contact with the natural environment, it awakens ecological awareness. “At the root of the environmental suffering and the human suffering we see today is the illusion that human beings exist apart from nature”, the psychologist Ana Sevinate started by explaining. “Intensive and large-scale industrialisation, a lifestyle that distances us from the landscape around us, these things start from the premises that resources are ours for the taking. So, we learn to see the ecosystem as something at our service, instead of understanding ourselves as belonging to the web of

life, along with so many other beings”. The result: “Human suffering can then be seen in alienation, anxiety, depression, the suffering of the Earth is manifested in the destruction that we are all seeing”. That’s why “we need psychology, as a discipline devoted to awakening human awareness, to understand that human beings cannot be studied or cured separately from the Planet”, argues the psychotherapist and author of the book “Being the Earth: When Psychology Embraces Nature” and co-founder of the “Ecopsychology Portugal” Group. Carla Fonte, psychologist, researcher and university lecturer, adds: “Ecopsychology seeks to study emotional responses to nature, the impacts of environmental issues, such as natural disasters and global climate change, the transpersonal dimensions of identity and environmental concerns”. In addition, she adds, “it adds to our scientific knowledge of the mental health benefits of including outdoor activities in psychotherapeutic counselling”, in particular their effect on preventing mental health issues, such as anxiety, depression or stress. These are effects that have long been scientifically proven: “A lot of research has shown that contact with nature (green areas, the open air, the sea and animals) can bring multiple benefits



The relationship between human beings and the natural world has implications for our identity, health and well-being.

and positive effects”, the researcher explains. So, what are these effects?

From stress to focus

To start with, lower levels of stress and anxiety. “People who live in areas with more green areas generally have lower levels of cortisol and report less stress than those who live in more built-up areas”, and people who do exercise in the open air “benefit not only from lower stress but also reduced levels of anxiety”, pointed out Carla Fonte. Alongside this, there is a reduction in depression. Citing several studies in this area⁽¹⁾, she offered the following example: “After walking for around 50 minutes in a natural environment, people with serious depression enjoy a highly significant improvement in mood and cognition”.

And there is more: improved sleep quality, reduction in aggressive behaviour, increased social connection, increased happiness, well-being and satisfaction with life, and better cognitive performance. An example: “Walking for 50 to 55 minutes significantly improves cognitive skills and performance straight afterwards, and participants who were sitting at desks with plants did better in attention and memory tasks”⁽²⁾.

The effects are also felt in relation to child development. Several studies⁽³⁾ have found that children who have gone for a walk in a park present improvements “in terms of attention/concentration”, results “similar to the effect of drugs for treatment of hyperactivity and attention deficit”. The mere presence of animals, the researcher continued, “has a positive impact on children’s attitudes to themselves and improves their ability to relate to others”.

As well as these multiple effects on mental health, it has also been found that nature has benefits for physical health. Lower blood pressure, improvements in heart issues, asthma and allergies, and in pain control, a stronger immune system, reduction in obesity and diabetes - all these are among the proven results.



“At the root of the environmental suffering and the human suffering we see today is the illusion that human beings exist apart from nature.”

Ana Sevinate
Psychologist and co-founder of the “Ecopsychology Portugal” Group



“Contact with nature can bring multiple benefits and positive effects.”

Carla Fonte
Psychologist, researcher and university lecturer

Forest bathing

Research conducted by the University of Exeter, in England, with 20 thousand people, and published in Nature⁽⁴⁾, concluded that spending two hours a week in contact with nature brings significant improvements to health and well-being. And that just “15 minutes of walking in woodlands increases the attention, positive emotions and the ability of individuals to reflect on life more constructively”.

Alex Gesse, founder of the Portuguese Forest Bathing Institute, and a guide trainer at the European Forest Therapy Institute, agrees that just a short time can have an impact: “In a simple moment, keeping your senses open and allowing yourself to be surprised by nature - the scent of a flower, birdsong, the feel of moss... - moments of consciousness can be experienced that contribute to health and well-being”.

Forest bathing, he explains, “is a practice based on nature, that increases our natural ability to adapt to changes in our lives in a more positive and healthy way”. For instance: To reduce cortisol levels we need 20 to 30 minutes, and for our general well-being, the dose of nature (exposure time) is 2 to 3 hours. He went on to explain that “Forest Therapy is a nature-based intervention that considers the specific needs of people and of the natural and social environment in which they live”, with the aim of “promoting positive states of mental health, strengthening the connection with nature and interpersonal relations”. In other words, it is related to the treatment and rehabilitation of professionally diagnosed mental disorders, and a course of treatment lasts around 12 weeks. But Alex Gesse points out that it is important that it should complement other forms of treatment: “No one is going to get out of a depression by spending a few hours in the woods, but if it complements the help of a mental health professional, forest bathing can help”.

The psychotherapist Ana Sevinate takes the view that “there’s no recipe for it”, and instead “we need to discover what works for us individually, and this is found in the relationship we establish with the environment and where we are”. This is where Ecopsychology can be a more or less obvious help. “One clear example is the therapeutic process taking place outdoors, in a natural setting. More



Spending two hours a week in contact with nature bring significant improvements to health and well-being.



Direct contact with the natural environment also has the power to awaken our ecological awareness.



“By keeping our senses open and letting ourselves be surprised by nature, we can experience conscious moments that contribute to health and well-being.”

Alex Gesse
Founder of the Portuguese Forest Bathing Institute

indirectly, the therapeutic process can also take place in the consulting room”. In both cases, she explains, “we work on an awareness of connections and belonging to a place, the landscape and the planet (we are the place, the landscape and the planet) and we listen to the experience manifested in our body, through our senses, and in our imagination”. And like any other relationship, she adds, “this one is also nourished by contact with our own story and the stories that the landscape tells us”, meaning that it is fundamental for us “to recover our curiosity, our capacity for contemplation and the possibility of play and being spontaneous”. In essence, this means encouraging a return to our origins. “As children”, she points out, “we bring this connection with us and don’t question it, and so

it is important to revive and nourish those memories, such as when we used to build sand castles on the beach or when we smelled the daisies on a walk in the country”.

Restore the connection

All this might seem overly philosophical, distant or spiritual. But in the current context of uncertainty, disruption and anxiety - caused by the pandemic, the war or the climate crisis -, the truth is that Ecopsychology has many resources and advantages to offer. “Restoring the connection between humans and nature involves physical and psycho-emotional contact with nature, the process of grieving for the devastation and environmental awareness and action”, argues Ana Sevinate, adding that “Ecopsychology can make an active

and deep contribution in relation to these different dimensions”. In other words, she continues, “when we talk about psychology and psychotherapy, we’re also talking about the possibility of finding new ways of relating to ourselves and to others and, in the outlook that Ecopsychology offers us, of relating to the whole living system that surrounds us and to which we belong”. Although people are unfamiliar with these issues, Ana Sevinate is confident that it is “something that will keep on growing”, not least because “there are already several psychologists and therapists committed to raising awareness”. She concludes: “At this moment, it is more than urgent that we should understand that the planet’s pain is a reflection of our own, and vice versa”. ●

1. Astell-Burt et al. 2014; Beyer et al. 2014; Cohen-Cline et al. 2015; Gascon et al. 2015; Kim et al. 2009; Maas et al. 2009b; McEachan et al. 2016; Nutsford et al. 2013; Sturm and Cohen 2014; Taylor et al. 2015; White et al. 2013
2. Berto et al. 2010; Li & Sullivan, 2016; 3. Fjortoft 2001; Kellert 2005; Blue, 1986; 4. <https://www.nature.com/articles/srep28551>

Hugo van der Ding and António Raminhos are familiar with the power of humour. More than laughing and making others laugh, they are fascinated by the intense exchange of emotions with others and, above all, with themselves, on a journey of self-discovery which helps them cope with their anxieties. Unfiltered vision, in the first person.

We don't all have the ability to look around and choose the comic and funny side of life. Above all at times of sadness or tragedy. We don't all know how to make people laugh, but we all benefit from laughter and its powerful therapeutic effect, which has long been studied by scientists. Very early in their lives, Hugo van der Ding and António Raminhos found humour to be way of reaching other people. And themselves. "The word humour didn't originally refer to comedy, it referred to emotions", says António Raminhos, recentring the conversation. "Our humour is our mood, and we say 'being in a bad mood' and we talk about 'mood swings'. Humour has to do with emotions and that's what makes it powerful." But what is its power? What is its effect on us? "It's biological", says Hugo van der Ding. "I can see the evolutionary advantage. When it's difficult to cope with an emotion, humour can help to



shift the focus or relieve our feelings. In extreme situations, laughter brings a release that helps us to cope. For example, jokes have an important function at funerals." As well as a "painkiller", Hugo van der Ding added that humour: "Helps us to put things in perspective. It shows us that everything has its ridiculous side. Even death and the way we think of it is absurd. If we step back a little, we can see that all living beings die. We make it into such an event, we wear black, we build mausoleums and pyramids - we are absurd! Laughter can bring us this ability to step back." António Raminhos shares this idea: "It's no coincidence that when a great tragedy strikes, you immediately get people inventing jokes. They're ways of taking it apart, taking away some of the weight from something very negative. A way of exorcising it." More than relief, sharing a laugh can also bring people meaning. "It certainly works for me", says António Raminhos. "A benefit that comes from feeling that I'm relieving others. It's a comfort and it makes us work. As a comedian, I feel the pleasure comes from putting people in a good mood." ●

The healing power of humour

“I loved making the whole class laugh. Humour is a really powerful way of asserting ourselves. We all have something that could make us a laughing stock. But the ‘class clown’ is untouchable.”

Hugo van der Ding



How can we laugh at times of crisis and find an uncertain future funny?

Hugo van der Ding: “Climate change, pandemic, war... Clearly, all this brings anxiety. In relation to the war and economic problems, my historical view of the world helps me not to be completely pessimistic. None of this is new and it all comes in cycles. The history of Europe is one of countries invading each other. All countries have invasions in their history.

As for climate change, I confess it’s rather more difficult. Firstly, because I can’t stand hot weather. I’d love us to have global cooling (laughter). Different animals would die, and everyone likes cold climate animals more than those that live in the heat. Just think of polar bears and snakes. But it worries me, of course. It’s horrible. We’re at a time when all the solutions we find are like a blanket that’s too short - we pull it one way, and leave the other end uncovered. But as I’m fascinated by historical dates, I think ‘What luxury! Of all the possible historical periods, we are living in the last!’ (laughter)”

António Raminhos: “Environmental issues are scary, of course. I try not to think about it too much. But I’m increasingly aware of the importance of attaching value to every moment. I try to be more present in the moment. It’s something I’ve found hard, and it’s still hard for me. Being present in a very simple moment. When I’m with my daughters, just being there. Looking them in the eyes and feeling ‘I’m here’. Coping with obsessive-compulsive disorder taught me that. I also don’t think in terms of a cure. The cure may be in the future, but I don’t want to live thinking about the future. I want to learn to deal with the here and now.

In relation to crises, there are those who think ‘this is all sh**’ and ‘it’s the end of the world’, and those who try to make something better here and now. There’ll always be the two tendencies. People who are more aware of the chaos seek to make the most of the moment, taking care of themselves and others. And then there are those who want to get drunk out of their minds and continue to mess things up for others. It has more to do with the individual than with the situation. But a crisis can be sort of liberating. In my case, of course I hit the bottle every day and don’t give a damn about anything else (laughter).” ●



The comedian’s anxiety when it’s time to go on stage: what if people don’t laugh?

This is something Hugo van der Ding and António Raminhos share even more than comedy. What they have in common is the care they take in preparing their shows. Then, they let it flow...

Hugo van der Ding: “What if people don’t laugh? That doesn’t bother me. At all. At the moment I create the show, I do what I have to do, what I believe in. And I do it as well as I can. I have no control over the next stage, which is people finding it funny or not. If we do stuff thinking about what people are going to like, it’s all wrong from the outset and it won’t work. That’s not to say I don’t get nervous a few minutes before starting. I always think: ‘This is when it’s going to go wrong, people won’t like it’. But experience brings a sense of assurance. And then it’s so much fun, the adrenalin of being on stage, that the nervousness evaporates. Being well prepared helps. ‘We’re all going to die’ is all written down, from start to finish. A lot of preparation goes into shows and a lot of teamwork. Even when there’s a lot of improvisation on stage, there’s a ground plan to be followed.”

António Raminhos: “I always write everything, then I rehearse. There are comedians who just take scribble a list of topics, and then walk on. I can’t do that. I’m happier if I take a gag I’ve worked on, and then I can improvise around it. In principle, I always think it’s going to be OK. But then, when the time comes, I know it’s going to be sh**. Waiting to go on is tough. It’s agony. I get anxious and the worst is that I’ve actually had panic attacks in the middle of a show. It was in ‘O Sentido das Coisas’, which I did before the pandemic. It was all very personal, and I was actually talking about anxiety. I think I managed not to let the public see. Coming out with my lines, but inside my heart was racing, my hands cold, and thinking: ‘I’m dying here, I can’t take it’. My head divides into three compartments: one that is speaking, one that is feeling the panic attack and another that says ‘I’ve had this several times and I know it won’t last’. I’m more aware of the process these days and manage to protect myself a bit better. I don’t get so emotionally involved. I was opening up a lot, without creating any distance. Before a show, I have to tell myself: ‘I’m here to share my story, not to share my emotions’. The show I’m working on now, ‘It’s not me... It’s my head’ involves opening up even more. But I think I now have a more professional awareness, so I’ll be able to maintain the distance I need. Or maybe not. We’ll see... (laughter)” ●



“Since I was a child, I’ve always used humour to relieve tension. A way of defusing situations to bring me some peace.”

António Raminhos

“Was that Hugo talking or his bipolarity?”

Hugo van der Ding was thirty when he discovered he was bipolar. Learning to cope with this disorder has been part of his personal life, and his professional life. He’s unwilling to be a “poster boy” for bipolarity, but acknowledges it was important to have shared his experience.

How does bipolarity influence your creative work?

I think I’ve managed to use some things in my favour. For example, a degree of obsessiveness. In “We’re all going to die”, I’ve done 800 deaths. No one can be bothered to stay focused like that. If I like something, I can manage to work on it for 20 hours non-stop. My humour is about an extreme way of seeing the world. I notice it even more in my writing. There are almost two voices. After being diagnosed, I spent a long time trying to understand what parts of me were the disorder and what

parts were me. Was that Hugo talking or his bipolarity? (laughter) One day I had an epiphany and realised there’s no such distinction. It’s all me. Without bipolarity, it wouldn’t be me. I might be a really boring person. I would do my own accounts and save lots of money (laughter).

Was it an important moment when you spoke openly about this?

It was important to have spoken about the illness. I got thousands of messages, and I still do, and they showed me how crucial it was for some people. Unbelievable stories, people who finally went to seek help. People who had never believed it was a problem, that they could alleviate the effects and they didn’t have to live like that. People who didn’t know there is medication. There’s a really big stigma, so people don’t speak openly, so yes, of course it was important to talk about it. But I don’t want to be a “poster boy” for bipolarity. Everything I had to say, I’ve said it. It’s not an easy subject. I can talk about it in connection with something else, like now. But no more than that. ●

“Comedians might be more prone to depression, but that’s true of everyone working in the arts, people who are creative. There’s an introspective part in creation that necessarily entails a certain melancholy. A super happy impressionist, for example, that’s not what we want!”

Hugo van der Ding



“I’m learning to cope with doubt”

António Raminhos has coped with obsessive-compulsive disorder since childhood. But he was only diagnosed at the age of twenty-six. Today, talking about mental health and his own story had brought new meaning to his comedy.

Does your obsessive-compulsive disorder manifest itself in any way in your work?

Yes, I’m always starting “And what if?”. My humour makes use of this device, which opens an unexpected third window. Only that instead of the “What if?” being an agonising doubt, like it is in obsessions, it’s about something silly. The new show starts with a story that is perhaps by

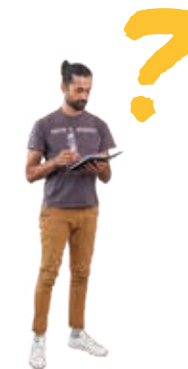
earliest obsessive memory. But then I deconstruct it.

Does coping with obsessions mean being overwhelmed by doubt?

Yes, and having something to do brings relief. That something is compulsion. When I’m less sure about my work, the obsessions start in a big way. I cope really well with real crisis situations, accidents, loss... I’m very pragmatic. But then my head focuses on obsessions that have nothing to do with anything. When I’m less sure of myself, I might suddenly obsess over a spot on my body: “Is it a disease?”. Nowadays, self-awareness and self-knowledge help me to cope. With my obsessive-compulsive disorder I learned - or rather, I’m learning - to accept doubt. Doubt is part of life, and we have a false sense of being in control. ●

“People who cope with obsessive-compulsive disorder are highly creative, because it’s a world of creativity - the possibilities that arise, the things we fear. Only that creativity is never for the good scenarios, it’s always for the worst.”

António Raminhos



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2. How can we **save** the planet?

Climate change has woken up humanity to the urgent need to defend the planet. But it's not just the climate that's at stake. There won't be a healthy planet without a better, more caring and sharing world. Because it's a road we have to travel together.

Filipe Duarte Santos, Chairman of the National Council for the Environment and Sustainable Development

“It’s important not to brush problems under the carpet”

Scientific literacy will be crucial in resolving the complex problems facing humanity. That’s why the geophysicist, Filipe Duarte Santos, an authority in climate change, is calling on young people to look “beyond the headlines”.

“Sustainability is not compatible with geopolitical tensions, wars, failure to combat climate change, delaying the energy transition, lack of water resources, fires and biodiversity loss”, argues Filipe Duarte Santos, calling on young people to pay attention to the scientific challenges that will help mankind to overcome dire problems like global heating. “The world depends increasingly on science and technology”, he maintains, pointing to knowledge as the key to our collective salvation. Regarding the media as “a kind of life belt”, essential in raising awareness of the challenges before us, Filipe Duarte Santos asks people to look “beyond the headlines”. And, he says, “it’s very important not to brush problems under the carpet. People need to pay attention, to understand what’s going on in the world”.

“Scientific knowledge is essential for resolving the problems and, in recent months, we have seen people insistently casting doubt on the existence of climate change, the re-emergence of a non-scientific narrative, given a platform on social media and TV, as a number of US think tanks endeavour to discredit science”, warns the geophysicist. It’s not hard to identify the organisations behind this “pointless and even economically damaging endeavour”. “Just recently, the secretary-general of the United Nations highlighted the joint profits of the largest energy companies in the first quarter of this year, some 100 billion dollars, due mainly to high oil prices”, he recalled, adding figures from the International Energy Agency that point to record CO₂ from burning coal, inverting the downward trend that had been observed since 2013.

“In cities, people are sitting at their computers, turn on the air conditioning and go to the supermarket where everything looks perfect. But in rural areas, the contact with the climate is more direct, farmers are more sensitive and vulnerable and the level of stress is higher.”



- Geophysicist by training, he chairs the National Council for the Environment and Sustainable Development.
- Full professor at the Science Faculty of the University of Lisbon, and regularly invited to lecture at prestigious universities in the US and Europe.

Economy feeling the effects

Closely interconnected, global heating and biodiversity loss are two of the greatest dangers currently threatening mankind. “Mankind and not the planet, as you hear people say. Ninety million years ago, the average atmospheric temperature on the surface was between 7 and 10 degrees Celsius higher, and there was diversified life on Earth, with dinosaurs and mammals. Our problem is rapid and accelerating climate change, which started with the Industrial Revolution and, in less than 300 years, has created extremely difficult situations for us. The planet, nature, will adapt, as they have before”, explains the chairman of the National Council for the Environment and Sustainable Development. Halting global heating requires, essentially, a transition to a new energy paradigm, not dependent on fossil fuels (oil, natural gas, and coal), which emit CO₂ and other greenhouse gases. “The European Union is a case in point, reducing emissions since 1990, but responsible for only 7% of global emissions.. The US only started to cut emissions fifteen years later, but China isn’t expected to get there before the end of the decade and India doesn’t even have an idea of when its emissions will peak”, explains Filipe Duarte Santos, referring to the world’s four largest economies, pointing out that the US remains, “by far, the largest per capita source of emissions”. “Without making the necessary transition to energies that emit less greenhouse gases, which requires cooperation between countries, we will have more droughts, more heat waves, more floods, which won’t affect us all equally, but without doubt will constitute a growing burden, and so hamper economic growth”, he concludes. Returning to the example of Europe, Filipe Duarte Santos says that “it’s possible to have economic growth with other forms of energy and less emissions, such as happens with renewables (solar, wind, hydro, geothermal and ocean-based energy) or nuclear. It requires effort, in terms

of investment, involves changing habits and is not welcomed by the oil companies”.

Danger ahead

“The most rational thing would be for countries to agree on making the energy transition, but with these profits, shareholders are not interested and there are powerful lobbies”, ignoring worrying signs, such as the fact that, in Portugal, “many municipalities have reached the limit in terms of water consumption. In France and Spain, there is already rationing, and it’s increasingly difficult to ignore what’s going on around us. In cities, you notice it less”, he admits, “because people are sitting at their computers, turn on the air conditioning and go to the supermarket where everything looks perfect. But in rural areas, the contact with the climate is more direct, farmers and more sensitive and vulnerable and the level of stress is higher.”

Filipe Duarte Santos puts his hope in young people, “with greater awareness and understanding. What they do will be crucial in this matter. My generation lifted hundreds of millions of people out of poverty, improved mobility and communications, with the digital revolution, but in terms of the environment and sustainability, the situation got worse. As a result, the number of people facing food insecurity is increasing again, because, on top of additional factors such as the war, which has led to a shortage of cereals and fertilisers, extreme climate events have harmed agricultural yields, as has been seen in India with wheat, in China with rice and in many other regions of the world.”

“Each generation brings fresh energy and a willingness to do things differently”, and so, argues Filipe Duarte Santos, we should work on building scientific literacy, rejecting “instant stimuli and gratification, without cultivating curiosity.. Science is the result of curiosity, it’s about wanting to observe and understand the world, and to look under the surface of things”, the only way of achieving the solutions that will take us to sustainability. ●

We need to talk

Education in uncertain times poses additional challenges. How can we bring answers and hope to a generation whose future will be marked by the consequences of climate change?

The future is “scary”. This is how 75% of young people feel, according to the largest scientific study conducted on climate change anxiety and its impact on younger generations. Published last December, in *The Lancet Planetary Health*, the study showed that emotions such as fear, sadness, anxiety, anger, powerlessness and guilt were mentioned by more than 50% of those interviewed. And more than 45% said that those feelings about climate change have a negative effect on their daily lives. The researchers listened to 10 thousand young people aged 16 to 25, in 10 countries, including Portugal. Of all developed countries, Portugal is where climate concerns are most keenly felt, according to the same study. Entitled “Climate anxiety in children and young people and their beliefs about government responses to climate change”, the study describes a scenario in which education becomes a greater challenge. Parents and teachers may be lost for better answers to give their children or students who seem to be awash in negative emotions and despair. At an age when they should be fizzing with energy and feeling that the world is their oyster, they are often apathetic, depressed, or anxious.

Physical manifestations of psychological suffering

“There’s no point” is something that Assunção Neto, a clinical psychologist, hears with increasing frequency from her clients. “There’s no point in

studying, no point in making any effort or investing for the future.’ This is a very common form of manifestation in the face of the uncertainty around the environmental crisis. And it reveals a response of paralysis. It’s the autonomic nervous system reacting”, she explains. She sees growing numbers of adolescents, at younger and younger ages, with symptoms which are reactions, sometimes unconscious, to worries about the future. Switching off may be part of the stress response to an imminent danger. “People can even faint as a result of this psychological state”, she tells us.

The fact that the threat is in the future does nothing to reduce its impact. “The response can be as intense as if the threat were present and immediate. And it might arise only because the person thinks about the subject or hears news of disasters. Or else in situations where you have to make plans for a future period of time”, explains Assunção Neto.

It is important to stress that these responses are not pathological. “They’re survival responses”, she says. “The problem is that when they last a long time, when they are triggered with great frequency, they cease to be adaptative - it’s what happens in relation to a threat like climate change”, she explains.

Adolescents are often unwilling to talk about what worries them. How can their parents know that something is not right? Assunção Neto advises them to pay attention to how they

express emotions through their bodies. Whilst fainting is an extreme case, not frequently encountered, others can be observed more often. “Anxiety can manifest itself in stomach pains or a sore throat. Sadness is a weight in the chest. The feeling of powerlessness is revealed in listlessness and a general lack of energy. Repetitive movements in hands and feet or a clenched jaw are all signs of anger”, she tells us.

Young people have lost the illusion of control and unrealistic optimism

“To maintain our mental health, we need a measure of unrealistic optimism and of the illusion of being in control.” So says José Palma-Oliveira, lecturer and researcher at the Faculty of Psychology of the University of Lisbon, an expert in Human Behaviour and the Environment. “They’re fundamental in order for us to make plans and to have ambition. The generation of millennials and those younger have lost both”, he believes. “For these adolescents and young people, the environment is of fundamental value. They were educated to preserve it and they’re highly engaged. What happens is that, when they’re confronted now with the effects of climate change - with news of fires like never before, extreme drought, water shortages and the ice melt - they perceive a threat and a loss of control, which causes them to lose any unrealistic optimism”, he explains. “That’s why more and more of them are needing psychotherapeutic support”, he concludes.





“Changing day-to-day forms of behaviour that might contribute to a better future, even if they’re small changes, is important and shows that the parents are also engaged.”

Assunção Neto
Clinical psychologist



“Adapting strategies is the future. It’s the only possibility.”

José Palma-Oliveira
Specialist in Human Behaviour and Environment

Worrying about climate change, and consequently about the future, has a negative effect on young people. Hope and optimism are absolutely necessary at those ages.

How can we help them to recover?

Assunção Neto is ready with her answer: “First, listen to them and attach value to their response. If they don’t talk spontaneously, which is most commonly the case, create opportunities, without questioning them. Example: they are listless, lacking in energy. Instead of saying ‘don’t be lazy’, we sit down with them, ready to listen, and ask ‘How do you feel when you’re like this? What do you think leaves you drained of energy?’. And then, take their answers seriously. Never reply ‘there’s no reason for you to feel like that’. If their feeling exists, it is always valid. Valuing our children’s feelings is fundamental.”

Her second piece of advice for parents is to take action, by working with their children to find activities that boost their well-being and enable them to recover the perception of control. “Changing day-to-day forms of behaviour that might contribute to a better future, even if they’re small changes, is important and shows that the parents are also engaged”, says Assunção Neto. “If they are very sceptical, I advise using the mosquito metaphor - if you think it’s too small to make a difference, try sleeping with a mosquito in the bedroom”. Lastly, encourage and allow them to get involved in groups, movements where they meet people of the same age and the same feelings about the world. “A good way to start is to find established groups that, for example, organise beach clean-ups.. This involvement creates a perception that their actions are useful and reduces the feeling of powerlessness. In addition to the contact with the outdoors, which in itself also helps. It’s the ideal antidote,

highly beneficial and significantly improves well-being”.

Act locally, starting at school.

In the case of teachers, José Palma-Oliveira’s advice is to think more about local and community action. “Teachers are at the beginning and the end of these processes. It’s they who reinforce the messages about environmental protection. The only strategy they should have is to centre their action on making changes locally. For example, posing questions: what resources do we have to make the classrooms cooler? Then, involve the students in changing things. Adapting strategies is the future. It’s the only possibility”, he says.

In his expert view, climate change has to be combated “at local level, and when that happens, it will be easier for young people to get back a sense of being in control”. For example: “In Lisbon, we urgently need to create ecological corridors, so that we don’t have heat islands. If we focus on an objective like that, if at school we study the matter and how to combat it, we’ll be helping students to feel involved and to recover that unrealistic optimism. We need strategies for action that specifically reduces the effects of climate change and that involves communities.”

This he sees as a fundamental consideration. He concludes:

“Whenever there’s a risk or perception of risk, there should be strategies for addressing it. But the strategies presented today to Portuguese children are largely global. Adaptation needs to be local. The slogan ‘Think global, act local’ sums it up. But in Portugal we still need to work on the second part.” ●

“I still dream”

Marta de Sá Vasco, aged 16, student

“I grew up hearing people talk about protecting the planet, saving water, recycling. At home, and also at school. But it wasn’t something I thought about much. When I was eleven or twelve, I started to pay more attention to these issues. I looked things up, watched the news, joined groups on social media. At the time, I was angry at how people didn’t seem to care. Older people, and also people of my age. How could it not matter to them?”

I decided I had to do something. At thirteen, I tried to give up eating meat. It was difficult because I wasn’t doing the cooking and I would go for meals with family and relatives, who weren’t vegetarian. So, I didn’t manage to give up completely, but I cut down a lot. I also tried to cut down on everything that was plastic and started to buy second-hand clothes.

Then, when I was fourteen or fifteen, I stopped believing so much in the view of things where each person individually carries the full burden of change. I started to look for information, I got to know more people with the same concerns.

Over time, my attitude also changed, I’m less optimistic today. But I have a great belief in science, and I think solutions will emerge. I know it’s difficult, but I believe that, as a species, we’ll find a way out of this.

In relation to the future, I try not to think too much. When I think, I tell myself that my ability to adapt will mean that my plans adjust to reality, if they have to. I still tell people I want to have eight children! So, my dreams are not affected by predictions of the future, or the news. I still dream. ●



Taking action is important for recovering the feeling of control. Parents and children should find things they can do together to work for a better future for all.

“My daughter’s supposed alienation turned out to be a way of protecting herself”

Ana Lúcia Reis, aged 40, mother of Matilde, aged 16

“My own awareness of the climate crisis increased as my daughter grew. I’d always done the things and believed in the values aligned with protecting the environment and the planet. And so she too grew up in tune with those values. In recent years, I’ve become more consistently aware of the issues, also because of the worsening climate crisis. And I noticed that I expected Matilde to be more engaged. Not that she rejected some of the changes I made in our everyday habits. On the contrary, she actually helped me decide on what to do. When I decided not to eat meat, five years ago, she was happy about that. And before I made that decision, she would suggest we do a ‘no-meat day’. Before I sold the car, she showed me the best way to take public transport somewhere. She’s never been very consumerist or bought lots of clothes. She got used to buying second-hand and reusing my old clothes, and from her aunt. The moment I realised I was expecting too much of her was when we had a conversation about the climate strikes and the demonstrations in 2019. Matilde was fourteen and didn’t want to take part. And I couldn’t understand why. She’d read the biography of Greta Thunberg a few months earlier, which seemed to me inconsistent with her lack of interest when it came

to action. Her reason was that none of her friends were going. I thought that couldn’t be the real reason, so I confronted her. Only later did I realise that the topic affected her more than I imagined and that what I took for alienation was actually a form of self-protection. She confessed she felt under too much pressure. And she thought it wasn’t fair for adults to tell her generation to sort out a problem they hadn’t created. She told me that we, the parents, were overburdening their generation, the children. And she’s right. It’s true because, we the parents, don’t have the lifespan needed to sort out the mess. I realised that this is something that makes her feel frustrated, indignant and utterly powerless. The school she went to at that time didn’t really do much about these issues. There was no opportunity for her to join in and take action. The school where she is now is different, there’s scope for that. She’s now the class representative, she takes the lead in things that involve all her classmates, and one thing she’s definitely isn’t is alienated. Given the chance to act, she got involved. After that conversation, I felt I was asking too much of her, in my own hurry to solve things. As I can’t resolve them in my own lifetime, I started to project my frustration on to her. My frustration at seeing that individual awareness counts for so little.” ●

Adolescents are often unwilling to talk about what worries them. How can their parents know that something is not right?



What generation Z thinks about the environmental crisis



3,567 European children and young people, aged 11 to 21, were listened to in an independent study conducted by Perspectus Global for Pro Carton (European Association of Carton and Cartonboard Manufacturers). The research, published in June 2021, sought to assess the attitudes of generation Z (children, adolescents and young adults born between the late 1990s and the early 2010s) in relation to climate threats. The findings shed light on how they feel about climate change: 92% of respondents believe that environmental degradation is one of the worst crises we face. Of these, 46% say that their parents’ generation is not doing enough to save the planet. 30% are confident everything will be OK. 24% believe that their generation will sort out the problem. 32% think that “planting more trees” is the best way of combating climate change. 45% selected “use more renewable natural materials” as one of their first two choices, out of six possible solutions.” ●



“I always try to transmit some hope to my students”
Ivo Meco, aged 42, secondary school teacher, biology and geology

“I see my job as educator as a kind of facilitator. We facilitate a view of the world. There’s a tendency to think of school as a preparation, a prelude to life itself. I think we need to do away with that idea. School is part of life. Younger generations are the agents of change. My way of approaching the environmental crisis with my students is in line with this assumption. They have to be engaged as political agents of change, which is what they are. The climate change issue is a political issue and has to be treated as such. It’s not a trend, or a fashion. I set up debates, on topics of current interest, which often involve environmental issues. I ask them to prepare arguments that address the issues from different perspectives. Then we draw lots to see who will speak for each side of the question. For example, about lithium: they looked into the advantages and drawbacks, the impacts, etc. At the time of the climate strikes, we also talked about them. Some wanted to go to the

demonstration, others not, but they all had the chance to express what they thought and felt. As teachers, we not only have to encourage critical thinking, but also to help them find and validate information. It’s not because a fashion influencer says something that it becomes absolute truth. Then we have projects that go beyond the class or even the school. Where I teach, there’s a lot of ecological awareness. We have projects across different subjects dealing with these issues. Citizenship classes also involve a large environmental component. But we also have involvement in community projects and voluntary work, which I think is very important. In terms of the environment, this can include beach and forest clean-ups and forest monitoring. In general, the students are very keen to get involved. I’ve been a secondary school teacher for fifteen years and my experience tells me that young people are not alienated, even when they don’t participate much. As a generation, they are clearly engaged and interested. The sense I get, is that these days they are more anxious. I can feel that during classes, and also from their marks. The past few years have been very difficult: as well as the environmental crisis, the pandemic and the war have made things very tough. In the midst of all this uncertainty, I try to transmit some hope. That comes naturally to me, it’s how I feel. However gloomy the future looks, I believe there’s a way forward. I’m not fatalistic and I think we need a degree of optimism. It’s what I try to transmit to them. Things change very quickly, with science and technology making great contributions, and that’s what I talk about.” ●

Eco-anxiety

An understandable response to a real threat

More and more people feel anxious, upset, angry or sad in response to the environmental crisis. Many suffer from eco-anxiety, and their well-being and daily lives could be affected.

It's a recent concept. So recent, that a lot of people don't even know there's a name for what they feel.

A name for that fear or constant worrying about the consequences of climate change. A name for the numbing anxiety in response to news and predictions of global warming. That name is eco-anxiety, and not only has it found its way into a dictionary, but it has been an object of study for several years among mental health researchers. But like any new concept, it takes time to enter our everyday vocabulary. And it runs the risk of being misunderstood.

Before defining the concept, we should first be clear about what it isn't: "Eco-anxiety is not an illness, it's not a disorder", stresses Teresa Raquel Pereira, psychologist, and researcher. "It's not a pathological response, or a clinical condition. If we look at eco-anxiety that way, we'll stigmatise the people who feel it and relieve society of the responsibility".

So how can we define the concept? "Eco-anxiety is the chronic fear of environmental destruction. It's an adaptative and understandable response to a real problem, the climate crisis", she replies.

This response can give rise to a wide range of emotions. "Worry, fear, sadness, anguish, anger, insecurity... All these emotions and states can fluctuate and alternate with each other, at different moments", explains Teresa Raquel Pereira. And the way people deal with these emotions might involve "denial, a form of protection, or a sense of numbness, or greater engagement with the environmental cause".

Anxiety keeps us on our toes

"It's an anxiety that's been growing as the effects of climate change get worse and worse. And above all as I started to realise that the steps that are being taken are not enough to address the problem." This is how João [not his real name], aged 51, defines his eco-anxiety. "I feel that these questions affect me more than the

people around me, that I spend more time thinking about them and they upset me more. Because when I tell people about my feelings, I don't find they share or even understand them. Other people don't seem to care. Either about the problem itself, or how I feel about it. And that's another thing that upsets me - the fact that no one seems to care", he confesses. Whilst saying how you feel is important, the reaction you get matters too "When other people are dismissive, it makes coping with the emotions more difficult", explains Teresa Raquel Pereira.

"Another thing that causes anguish is the fact of having children. I think about my children, and their children and grandchildren. The timescale on which we've plotted the effects of climate change suddenly seems very short. If we think of the speed at which everything has happened in the past twenty years, what will things be like in 2100?", asks João. Teresa Raquel Pereira sees these questions and feelings as natural: "Anxiety is an adaptative process, that prepares us

Researching the impact of the climate change on young people's mental health

The psychologist Teresa Raquel Pereira is working on a doctorate in Psychology and Climate Change, at the University of the Minho, seeking to assess the impact of the climate crisis on the mental health of young people aged 16 to 24. "Young people are more vulnerable, because they feel a lot of uncertainty about the future", she explains. "It's an especially sensitive stage in life and we want to understand how they experience the climate crisis. So, we're looking at attitudes, behaviours and impacts on daily life, gather data using an app they install on their smartphone", she told us. There are one hundred young people involved in the study, which seeks to shed further light on what is a very recent area of study. "The idea is to help focus efforts on how best to support this generation", she explained. ●



for a dangerous situation. Like fear, it makes us more alert and enables us to gain control over a problem”, she explains. But managing the emotions is especially challenging in these cases where the environmental crisis is the factor triggering the anxiety. “It’s more difficult to create a sense of security and control, faced with a problem on this scale”, says Teresa Raquel Pereira. A real challenge for mental health professionals themselves.

How we can react and help

“When we feel that someone’s well-being is under threat and they may have trouble managing their emotions in response to the environmental crisis, we first need to listen and validate their feelings”, advises Teresa Raquel Pereira. “It’s very important that in your circle of family and friends people respond by accepting”, she says.

In relation to the person suffering the anxiety, although this is a recent area of study, research has shown that:

“The most effective response to eco-anxiety is action”, the psychologist assures us. “Either through everyday activism, adopting habits that make us feel part of the solution, or by joining environmental groups. It may sound contradictory, that increased engagement will help, but the fact is that it brings a greater sense of control and empowerment, cancelling out the feeling of powerlessness”, she explains.

João acknowledges that this feeling increases his unease: “The sense of powerlessness is even more distressing. I know that our individual actions play their part, but the fact is that we’re dependent on others.”

Teresa Raquel Pereira stresses that all these responses are understandable and that some have argued that people with eco-anxiety are merely more aware and awake to problems that are facing us all: “They are people with a particular connection with nature and who are more sensitive. We might say they are able to feel eco-empathy and eco-compassion.” More new concepts for the great crisis or our times. ●

A platform connecting psychology and climate change

ECOPSI is an informal groups of mental health professionals set up two years ago. It was inspired by the British Climate Psychology Alliance and sets out to promote mental health and psychological well-being in the context of the potential impact of climate change. It acts in the field of prevention, as well as working directly, through psychotherapeutic support. ●



People who suffer from eco-anxiety have a particular connection with nature and are more sensitive.



This anxiety results from concern about the consequences of climate change and the present and future state of the planet.



“The most effective response to eco-anxiety is action”

Teresa Raquel Pereira
Psychologist and researcher

History of a new word

The term eco-anxiety was coined by the philosopher, Glenn Albrecht, in 2011. The American Psychological Association was the first institution to use it, in a 2017 report in which it examined the impact of the environmental crisis on mental health. Since then, the concept has been increasingly studied and debated. But it only started to enter the awareness of the public from 2018 onwards, with the worsening effects of global heating and the climate demonstrations around the world, many inspired by the activism of the teenage Greta Thunberg. She is regarded as the archetype of how eco-anxiety can devastate someone’s life. And how action can be the way out of it. ●

Pond in the process of rehabilitation on the Espirra Estate, owned by The Navigator Company.



Giving new life to the landscapes and the planet

With 75% of terrestrial ecosystems currently degraded, ecological restoration is today of massive importance. We are in the United Nations Decade on Ecosystem Recovery and the European Commission has just announced a legislative package which, once approved, will require member States to restore all their degraded ecosystems by 2050.

Down the centuries, mankind has shaped the world to meet its own needs, not always sustainably. As a consequence, biodiversity has diminished and many of the planet's habitats are degraded. Today, ecosystem degradation affects 75% of the planet's land surface and has a negative impact on the well-being of around 3.3 billion people. A situation that has shone a light on the need for ecological restoration, as a way to preserve the planet's resources and to combat hunger and poverty around the world. "We need to replant and protect our forests. We need to clean up our rivers and seas. And we need to make our cities green", said António Guterres, secretary-general of the United Nations, at the launch of the UN Decade for Ecosystem Recovery, in June 2021. The Biodiversity Convention has in turn called for the restoration of natural and semi-natural ecosystems, including those in an urban setting, as a way of reversing biodiversity loss, improving environmental services, combating desertification and mitigating the effects of climate change. The degradation of ecosystems endangers the ecological services they provide, such as carbon retention, reduction of air pollution, availability of drinking water, food production, soil fertility and reduction of erosion. "Ecological restoration is the best quickly available technology for sequestering carbon and helping to combat climate change, and is also the best way of keeping water in the soil and mitigating floods

and droughts", explains Helena Freitas, a researcher and university professor in the field of biodiversity and ecology. The aim of ecological restoration is not to return the ecosystem "to pristine condition", but to ensure that it returns to a functional state, close to its original state. Preserving and regenerating native forests, rehabilitating water courses, restoring peat bogs and wetlands, and halting and reversing biodiversity decline are some of the techniques used.

A decade of change

Led by the United Nations Environment Programme (UNEP) and by the United Nations Food and Agriculture Organisation (FAO), the Decade for Ecosystem Recovery (from 2021 to 2030) is intended to inspire and support governments, organisations, and civil society in eco-restoration initiatives around the world. This ranges from re-targeting tax breaks and funding to promote ecosystem restoration, to scientific research and training for workers in the sector. António Guterres stressed that ecosystem restoration means much more than preserving and restoring the planet's resources. According to the UN secretary-general, investment in habitat restoration will create millions of jobs by 2030 and generate more than 7 trillion dollars in annual income. In June this year, it was the turn of the European Commission to announce a package of legislation designed to require member States to restore 20% of their natural

72%
of habitats in a poor
state in Portugal

7
trillion
dollars
of global annual
income associated
with ecological
restoration

Cuttings are a technique used in natural engineering to reproduce species.



António Aires
The Navigator Company's Forestry Production and Operations Department, Southern Region Coordinator

heritage by 2030 and all degraded ecosystems by 2050. According to the latest figures, more than 80% of European habitats are degraded. In Portugal, the latest State of Nature in Europe report (2020) indicated that 72% of habitats are in an unfit or poor state and that 80% are tending to degrade even further if nothing is done to avoid this. If approved, the impact assessment conducted suggests that this Nature Restoration Law will have socio-economic consequences that far outweigh the costs involved. The Portuguese Ecological Restoration Network was founded in 2019 with the aim of gathering information on the topic, promoting initiatives, raising public awareness and investing in training. However, the restoration projects undertaken up and down the country over the past decade have already pointed to the growing importance attached to habitat rehabilitation. From ReDuna, which involved planting suitable plants on the beaches of São João da Caparica in order to restore and maintain the dune system, to the rewilding of streams in the municipality of Cascais, and the project for ecological restoration of the Mediterranean landscape on the left bank of the Guadiana, examples can be found all over Portugal.

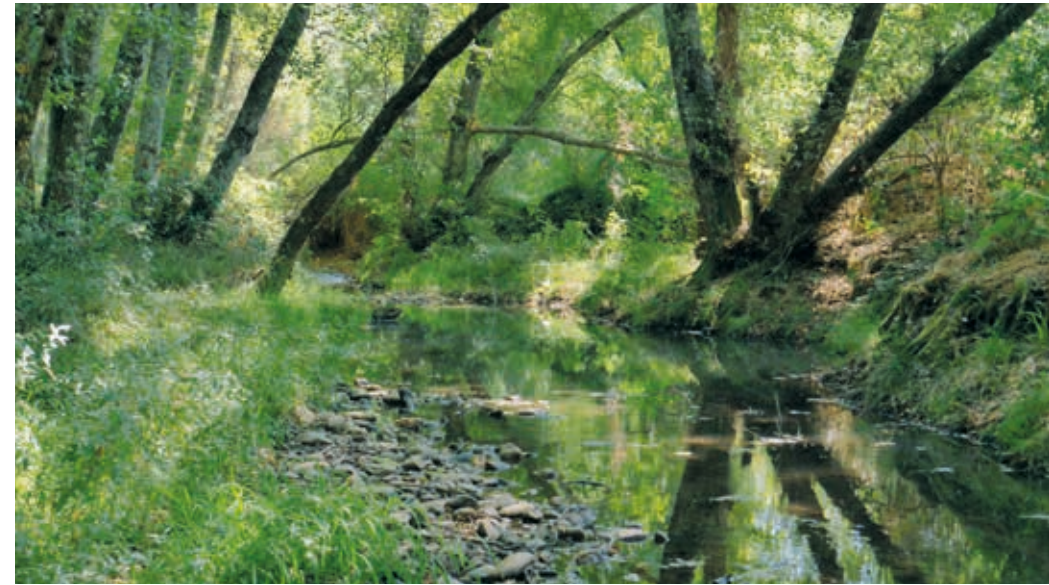


Nuno Rico
Biodiversity conservation officer at The Navigator Company

The example of The Navigator Company's woodlands restoration

With 11.8% of its land holdings managed only for conservation purposes, Navigator has been engaged in ecological restoration work for several years. "On our properties, we have habitats identified and protected by the Natura 2000 Network and others which, depending on

their value, size and state of conservation, are classified as areas of high conservation value or protection areas", we are reminded by Nuno Rico, the company's biodiversity conservation officer. Navigator's approach has been to think of the ecosystem as a whole. "By improving the habitat, we're going to improve all the species depending on it", explains Nuno Rico, who also drew attention to the work done in restoring water courses. "Riverside areas provide very important ecosystem services and are an essential habitat for several species. One of our priorities in improving vegetation along water courses After monitoring and classifying the state of the different habitats, what we do is to ensure that those in a good state stay that way, identify the priority habitats for restoration and take action over time", he explains. It's not always easy to restore some of these habitats to their theoretically climatic state. "Due to climate change, a lot has changed: often it doesn't rain in the month it's supposed to, which makes us change our plans and, in future, could cause some of the vegetation to start migrating northwards, potentially undermining the recovery", he tells us. What's more, the work has to be tailored to each site. "Restoration work differs between the north and south of the country. The vegetation changes and it is also importance to understand the soil type, precipitation levels, altitude... In practice, to achieve the potential, there's no set recipe that can be applied universally", he says. At the Espirra Estate, owned by The Navigator Company, an ecological restoration project has been under way for three years, with the aim of



A water course in a good state of conservation, at the Caniceira Estate, owned by The Navigator Company.

Navigator has conducted restoration projects for several years, and approaches the ecosystem as a whole: by improving the habitat, these projects improve all the species dependent on it.

controlling invasive species - acacias and canas - and of restoring the stream that flows across the estate. "Acacias has grown up very densely along the water course over the past 20 or 30 years", recalls António Aires, southern region production and operations coordinator. The first step was the fell the trees and remove the biomass, followed by destroying the stumps, to stop them shooting. "The next year, we removed the acacia shoots using machinery and by hand, and then sowed bird vetch, lupins and triticale, in order to create a seed bank to feed a series of birds and enrich the fauna on the estate, as well as to stabilise the banks of the stream", he explains. At the same time, we restored the water course, which had become highly artificial. "Apart from the invasive species, which occupied a lot of the space, there were a few willows and little else", recalled António Aires. After removing the canas and acacias, the banks were rewilded. The next autumn saw the start of a new stage, with the introduction of alders, willows, poplars, ash and hackberry, which will once again adorn the banks. "We're talking about going from one or

two species of willow to more than 30 species", he says proudly. Outside the riverbank area, fruit trees will be introduced. In addition to reconstructing the original habitat, the aim is to quickly provide food and shelter for fauna In this area there will be hawthorn, Iberian pear trees, laurustinus, mulberry trees, sour cherry trees, fig trees, arbutus and carob trees. "The idea is to have species the bear fruit at different times, so there is food all year long", explains António Aires. "Our priority is to have species with seeds produced in this region, to avoid bringing outside genotypes in to the estate", he says. "One of the difficulties of restoration is that there aren't always the species available to do it. I prefer promoting natural regeneration, but at Espirra it's more complicated, because after removing the invasive species, it was left almost bare... With the willows, we're going to use natural engineering techniques and reproduce them using cuttings. The problem exists with species such as alder and ash, where it can be harder to find local ecotypes", we hear from Nuno Rico. Even with the restoration work at an early stage, the results are already visible. Species that were never seen before, like partridge, doves and hares, are now moving on to the estate, where last year a pair of booted eagles also found a nesting site. "It's a process that takes time", says António Aires, confident in the future. "In ten or fifteen years there'll be a riverside gallery forest dividing the estate in two, which will help in the event of a fire, functioning as a barrier. It will be a cooler area with greater biodiversity, that we can then enrich even further". ●

You can see examples of Navigator's conservation and restoration projects in the previous edition of our magazine (nº 10), at www.myplanet.pt

Micro plastics, macro danger

It is now beyond dispute that plastic pollution is harmful to the environment. But microplastics are a concern that has only recently gained public awareness. What are they? Where are they? What are their consequences for human health?

Microplastics are small fragments of plastic material, measuring less than 5 mm.

They vary in source and type, including polyethylene (such as from bags and bottles), polystyrene (food containers), nylon and PVC. These plastic items are being degraded by heat, UV light, oxidation, mechanical action and biodegradation by living organisms, such as bacteria, processes that produce ever smaller particles, which join the category of microplastics.

The environment of a beach, with plentiful sunshine and high temperatures at ground level, is where degradation processes occur most rapidly⁽¹⁾. On the hot surface of the sand, plastic rubbish "wilts", turns brittle and then cracks and disintegrates. High tides and the wind pick up the miniscule particles of plastic and add them to the vast tracts of rubbish found in the oceans. There are two types of microplastics. Primary microplastics, which are originally produced in this size and include items such as glitter, abrasive materials used in domestic cleaning products or microspheres used in cosmetics and personal hygiene products, such as exfoliants and toothpastes. Secondary microplastics,

which are fragments resulting from the degradation of the detritus from larger plastic items; some plastic containers, even when whole and in good condition, can also release microplastic particles over time or when heated.

Effects on the environment

Marine life is worst affected by plastic pollution - it's the factor responsible for the death of more than a million seabirds and 100 thousand marine mammals each year. At present, the amount of plastic reaching these ecosystems is 11 million tons a year and, if consumption of this fossil-based material does not diminish, the report entitled From Pollution to Solution⁽²⁾, from the United Nations Environment Programme states that between 23 and 27 million tons of plastic will end up in the ocean every year for the next two decades. Many persistent organic pollutants, such as pesticides and dioxins, float on the oceans in low concentrations, but because they are hydrophobic, they cause plastic particles to agglomerate on the surface. Marine animals feed accidentally on microplastics, and at the same time ingest these pollutants⁽³⁾. This causes chemicals to accumulate in animal tissue, increasing in concentration as

Microplastics can decompose into even smaller particles, known as nanoplastics. These have a size of less than 0.001 mm.

Which neither absorb nor retain water.

Some plastic containers, even in good condition, can release microparticles over time or when heated.

the pollutants travel along the food chain.

The plastics ingested are harmful to marine organisms for reasons other than the chemicals they bring with them, as they can block their digestive systems or cause internal damage through abrasion⁽⁴⁾. Because of their abundance, microplastics supply countless surfaces for small organisms to attach themselves to, and the growth in opportunities for colonisation has unforeseeable consequences for the populations of these organisms. And because they are very light, they function as “rafts”, allowing the organisms to travel much further than would normally be the case, serving as vectors for dissemination of invasive marine species⁽⁵⁾.

Effects on human health

We find microplastics in a series of articles to which we are exposed on a daily basis, such as water bottles, synthetic grass and cosmetics. But these miniscule particles are also in the air we breathe and the foods or drinks we ingest. And they have harmful effects on human health⁽⁶⁾. What these effects are, in the long term, is still not very clear, but several studies indicate that they may lead to increased inflammatory responses and toxicity, and disrupt the intestinal microbiome⁽⁷⁾. Others say they are able to affect human cells, leading to oxidative stress and immune responses (such as allergic reactions)⁽⁸⁾. In a study published in 2021, scientists detected microplastics in

87%
of incorrectly managed waste is disposed of in nature and turns into plastic pollution.*

1 ton
In 2025, the ocean will have 1 ton of plastic for every 3 tons of fish.*

75%
of all the plastic ever produced is now waste.*

5 g
On average, each of us may be ingesting 5 grams of plastic a week.*



Taking action against plastic pollution

Predictions tell us that, in 2050, the oceans will hold more plastic than fish. Difficult to biodegrade, plastic gradually deteriorates and breaks into smaller pieces, such as microplastics and nanoplastics, which enter our food chain and have an impact on our health and that of the planet.

Reducing single use plastic is the main step we can all take to halt plastic pollution. And the sooner we start, the better. As part of the UNESCO Green Citizens programme, Amy and Ella Meek, two young sisters from the United Kingdom, have founded “Kids Against Plastic.”, mobilising young people against single use plastics. The collection drive they are organising is international: **just collect plastic and log it in the app**, helping to meet the target of one million articles collected. ●



On average, a person consumes 1,769 particles of microplastics per week, just in the water they drink.*

the placentas of healthy women⁽⁹⁾. In other words, the particles were small enough to be transported by the blood current. Even so, microplastics were not detected in all participants in the study, leading the researchers to conclude that certain lifestyle factors may have an influence.

How they enter our body

Although more research is needed to understand the impact of microplastics on our health and well-being, we know that they are everywhere. For example, they can easily be found in a great variety of foods and drinks.

A study discovered that some brands of bottled water are contaminated by microplastics, in particular the polypropylene used to manufacture the bottle tops⁽¹⁰⁾. Although tap water contains microplastics, the levels are much lower, in comparison with that bottled water⁽¹¹⁾.

Microplastics have also been found in beer, packaged sea salt, seafood and fish⁽¹¹⁾.

Some tea bags are made of plastic, and research has shown that on immersion in water they can release 11.6 thousand million particles of microplastic in a single cup⁽¹²⁾. In April this year, a pilot study

conducted by scientists at Vrije Universiteit Amsterdam, in Holland, reported for the first time microplastics contamination in beef and pork, as well as in the blood of cattle and pigs in farms⁽¹³⁾.

We ingest microplastics with our food and drink, but we can also inhale them. A study in Australia found that the airborne dust inside a house can contain a broad range of microparticles, some of which are plastic-based⁽¹⁴⁾.

Higher rates of inhalation and ingestion of these microplastics were found in small children, and the researchers’ explanation has to do with the higher breathing rate, combined with their smaller body weight. They also spend more time playing on the floor, and often bring their hands to their mouths, increasing the probability of being exposed to microplastics present in the dust.

Vacuum cleaning the house at least once a week helps reduce the levels of airborne microplastics, according to this Australian study. In other cases, limiting exposure to these small particles requires changes in habits, in particular avoiding the use of plastic whenever possible, and using natural materials instead. ●

* WWF, No Plastic in Nature: Assessing Plastic Ingestion From Nature To People (1) www.sciencedirect.com/science/article/abs/pii/S0025326X0800430X?via%3Dihub (2) <https://wedocs.unep.org/bitstream/handle/20.500.11822/36965/POLSOLSum.pdf> (3) <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0240792> (4) <https://setac.onlinelibrary.wiley.com/doi/10.1002/ieam.1913> (5) www.sciencedirect.com/science/article/abs/pii/S0045653520327363?via%3Dihub (6) www.mdpi.com/1660-4601/17/4/1212 (7) link.springer.com/article/10.1007/s40572-018-0206-z (8) www.sciencedirect.com/science/article/abs/pii/S0304389421028302?via%3Dihub (9) www.sciencedirect.com/science/article/pii/S0160412020322297?via%3Dihub (10) www.frontiersin.org/articles/10.3389/fchem.2018.00407/full (11) journals.plos.org/plosone/article?id=10.1371/journal.pone.0194970 (12) pubs.acs.org/doi/10.1021/acs.est.9b02540 (13) www.plasticsupfoundation.org/wp-content/uploads/2022/07/Final-Report-pilot-study-plastic-particles-in-livestock-feed-milk-meat-and-blood-SIGNED.pdf (14) www.sciencedirect.com/science/article/abs/pii/S0269749121006461?via%3Dihub

Paper: the alternative from the forest

Replacing fossil-based plastic, swapping it for packaging solutions based on a natural raw material, obtained from forests planted and managed sustainably, is the key concept of the “From Fossil to Forest” agenda, headed by The Navigator Company.

The Navigator Company has worked to highlight the obvious environmental benefits, offering renewably sourced products that are biodegradable, recyclable and free from fossil carbon, to be used instead of single use plastics. The first visible expression of the “From Fossil to Forest” strategy was the launch of a series of products aimed at the packaging segment, under the gKraft brand. The distinctive element of this range is the use of *Eucalyptus globulus* as raw material, paving the way for a new packaging paradigm. Portuguese eucalyptus fibre, obtained from forests planted and replanted for this purpose, under responsible and certified management, confers a number of advantages on this paper, and environmental sustainability is one of the most important. On the one hand, cellulose is a naturally sourced product that is renewable, recyclable and biodegradable,

and can replace plastic from the perspective of a circular bioeconomy. On the other hand, the special properties of *globulus* means that it offers advantages, even in comparison with other cellulose fibres, including the possibility of producing the same amount of paper from less wood (with Scandinavian pine, for example, up to double the amount of wood is needed), resulting in seven times more square metres of packaging per hectare of forest (also in comparison with Scandinavian pine). It is also more compostable (due to containing less lignin) and more recyclable (up to 150% more, compared with other hardwood species), generating recycled products that offer increased strength. gKraft is based on an innovative high yield kraft eucalyptus pulp (HYKEP), that uses less wood whilst offering levels of mechanical strength of great interest to this segment. It is the result of technological research by

RAIZ, Navigator’s forest and paper research institute, which is also working to solve other challenges, including issues relating to food packaging and coatings with barrier properties, in order to replace fossil-based plastic films. The gKraft range includes an extra white paper for applications and users for which this is important, especially in terms of colour contrast and printing quality in general. The target market here includes, for example, shopping bags for top fashion brands. A natural white kraft paper line, without optical brighteners. A brown kraft paper line designed, for example, for retail and shopping bags, including in lower grammages, intended for the food industry (for bread and cakes, for instance). And also papers for producing high value added cardboard boxes (kraftliners), used, for example, for packaging in e-commerce and to display products at points of sale - with the expansion

of e-commerce and the gradual replacement of plastic packaging in retail outlets, these papers have become more importance to the strategy of many brands, and are currently in great demand. Another important argument in favour of gKraft is food safety and hygiene: it is produced exclusively from virgin eucalyptus *globulus* fibre which, unlike recycled fibre, avoids any danger of contamination. This makes it a safer and more hygienic range of papers for contact with skin and with food. The Navigator Company has had gKraft papers approved for contact with food by ISEGA, the German certification institute for packaging products, and also by InnovHub in Milan. Navigator plans to establish itself as the go-to manufacturer in this area, creating forest-based products to substitute fossil-sourced articles, and helping to respond to the challenges of climate change. ●

One paper line, three sub-brands

BAG. Intended for various types of bags, sachets, packages and even some heavy-duty envelopes, used, for example, in e-commerce. Already used by leading international brands such as Zara, Intimissimi, Victoria’s Secret, Desigual, Nike, Museu Cristiano Ronaldo and Real Madrid; by food retail chains such as Aldi and Lidl; and by fast food chains like McDonalds. It also has industrial applications, such as multi-ply bags for flour, animal feed or bags of animal litter.

FLEX. Designed for flexible packaging with multiple uses, such as production of sugar packets or wrapping paper for sliced food; or for use in logistics/dispatch, to stabilise loads and fill empty spaces between products and primary packaging, or between primary and secondary packaging; or else in combined solutions with other materials, in particular for wrapping and lining papers.

BOX. Suitable especially for corrugated cardboard packaging, making for reduced grammage and consequently lighter or stronger boxes for a range of products, in the agricultural, industrial, retail and e-commerce sectors ●

Cellulose is a naturally sourced product that is renewable, recyclable and biodegradable, and can replace plastic from the perspective of a circular bioeconomy.



Greener cities

Urban woods and parks help create more resilient and sustainable cities. Because, among other benefits, they absorb carbon dioxide, reduce noise, temperatures and pollution, protect biodiversity and avoid soil erosion. An increasingly urgent mission.

The idea started to take hold in the nineteenth century, but it was only in 1934 that new legislation promoted the planting of woodlands in the

Monsanto uplands in the outer reaches of Lisbon. The project was taken in hand by Duarte Pacheco, and 43 carefully chosen species were planted over a vast area between Alcântara, Belém, Ajuda and Benfica. Since then, the “lungs” of the capital have grown from 600 to 1,045 hectares, with more than 250 thousand trees, 103 species of birds, 157 species of mushrooms, as well as an eco-park, viewpoints, trails and leisure areas.

The creation of this huge park (today, one of the largest in Europe) on rocky uplands is living proof of how forests can flourish in an urban setting. In 2016, Monsanto was the first urban woodland park in Europe to gain certification for sustainable management, and shows that, when properly used and managed, these areas can bring a host of benefits for city dwellers.

The ongoing process of urbanisation and growing prosperity will together add to the size and density of cities (according to the UN, 55% of the world’s population lives in urban areas and the expectation that this will rise to 70% by 2050), at the same time as the effects of climate change are being felt. Heatwaves are more frequent, the sea level is rising, changes in rainfall patterns are increasing the risk of coastal flooding and overloading urban drainage systems for rainwater... all this puts pressure on urban communities to find innovative ways of building liveable and “clean” cities. Inevitably, one of these solutions involves planting parks and gardens. Planted forests absorb and store carbon, help to fight deforestation and to preserve biodiversity and ecosystems, and also ensure that water and nutrients remain available in the soil. As well as this, trees can help to avoid urban heat islands, reducing the need for air conditioning if planted in the right location around buildings. In cold climates, they protect houses against the wind and economise on the energy used for heating. What is more, green areas can have a positive effect on the health

Lisbon seen from Monsanto Park.

Forests and parks can help create more resilient and sustainable cities, better able to face the challenges of a growing urban population.

and well-being of people and help to build more cohesive societies.

There is no time to lose

Advantages that have been recognised and taken ever more seriously. In 2018, at the first World Forum on Urban Forests, the FAO (the United Nations Food and Agriculture Organisation) argued that forests and parks could help create more resilient and sustainable cities and enable them to face the challenges of a growing urban population. Hiroto Mitsugi, director-general of the FAO Forestry Department, declared that "more sustainable models of urban growth are urgently needed", arguing that "existing cities and those of the future should plan parks and urban forests to respond to different needs". An FAO report this year, entitled The State of the World's Forests 2022, has again stressed the importance of preserving the soil, forests and agro-forestry systems in combating environmental crises, mapping out three pathways to achieving these aims: firstly, halt deforestation and maintain existing forests, secondly, restore degraded land and expand the use of agro-forestry systems, and thirdly, use forests sustainably and build green value chains. It issued a warning: "There is no time to lose - action is needed now to keep the global temperature increase below 1.5 °C, reduce the risk of future pandemics, ensure food security and nutrition for all, eliminate poverty, conserve the planet's biodiversity, and offer young people hope of a better world and a better future for all". The importance of forests in mitigating climate change has also been championed by New Generation Plantations (NGP), a project by the World Wide Fund for Nature (WWF), which over the past decade has repeatedly called for "a variety of landscape restoration approaches". "Well managed plantations, in the right places, can help to conserve biodiversity and respond to human

needs, contributing to sustainable economic growth and to local livelihoods", argues NGP.

Growing

The course appears to be set and the numbers are encouraging. Whilst forests continue to vanish - although the pace of deforestation is slowing, with 10 million hectares being lost each year between 2015 and 2020, according to The State of The World's Forest 2022 -, the planting of new forests has grown, reducing the pace of losses to the total forested area: from 7.8 million hectares a year in the 1990s to 4.7 million each year in the decade from 2010 to 2020. Planted forests cover 294 million hectares, representing 7% of all the world's forests, having grown at a rate of 1% a year from 2015 to 2020.

One example: every year, the pulp and paper industry plants more trees than it cuts down: an average of five for every tree used to make paper, according to TAPPI (Technical Association of the Pulp & Paper Industry). In 2020, according to figures from CELPA (the Paper Industry Association), companies in this sector in Portugal planted 6,287 hectares of forest and were responsible for the sustainable and certified management of almost 192 thousand hectares (5% of the country's forests).

We're on the right track, but there is still much to do. According to a study by a group of scientists at the Federal Institute of Technology (ETH) in Zurich, Switzerland ("The global tree restoration potential"), the first study to calculate how many additional trees the plant is able to support, where they can be planted and how much carbon they would be able to absorb, 1.2 billion trees would be needed to counteract global heating. If these were planted, the researchers assert that carbon levels in the atmosphere would drop 25%, returning to those recorded in the early twentieth century. ●



The Botanical Garden in Coimbra

70%
Percentage of the world population expected to live in urban areas in 2050, according to the UN.

294 million
Hectares of planted forests in the world (7% of total).

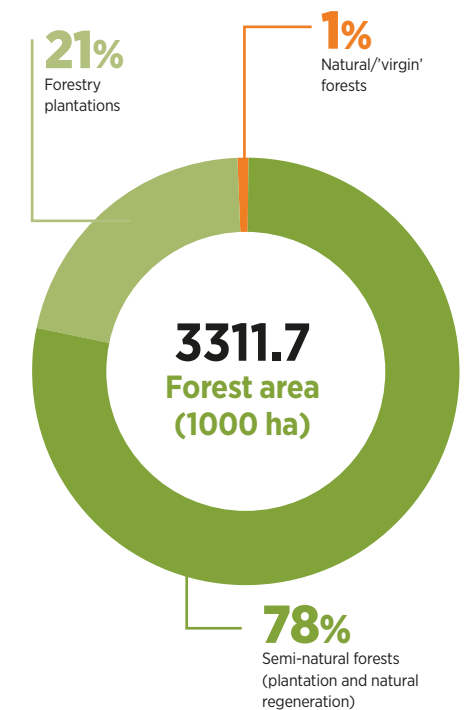
6,287
Hectares reforested by the pulp and paper industry, in Portugal, in 2020.



Plantations bring growth to Portuguese forests

Portugal has 36% of its territory occupied by forests. It was in the late nineteenth century that the country's forestry service was created and started work on reforesting uncultivated land. Before that, estimates suggest that the country's forests occupied no more than 7% of its territory. Today, we know that without planted forests, Portugal's woodlands would be significantly smaller. Native forests account for less than 1% of all woodlands in Portugal, whilst what are called semi-natural forests, consisting of native and exotic species, regenerating naturally or through planting, constitute the large majority, at 78.4%. Planted forests represent 21% of the total. ●

Natural forests (untouched by man) account for less than 1% of Portugal's woodlands.



Source: FRA Platform (fao.org); figures rounded up/down

Every year, more than 12 million young trees start their lives in The Navigator Company's nurseries, which produce 135 species of trees and shrubs.

From fast forests to trees in the backyard

In recent years, the cities of Lisbon and Porto have shown that they recognise the importance of green areas to the creation of healthier and environmentally “friendlier” urban areas. Here and there, trees are planted and mini forests are growing.



Lisbon Municipal Council (CML) has committed itself to “sustainable use of land” and to “protecting and improving its natural areas, at the same time as providing quality outdoor recreation areas for its citizens”. Lisbon’s first Fast Forest started to grow in January in the Bela Vista Park, in Marvila. In all, there are 2,500 square metres of forest planted mostly by volunteers, with 70% of the trees provided by CML under its reforestation programme, to make the city more resilient to climate change. This project is the work of Urbem, an organisation that has joined forces with the local authority to promote more forests of this type within cities,

able to absorb carbon and provide a home for flora and fauna. The “Miyawaki method” was chosen to create this mini forest, planted with the aim of restoring biodiversity. Developed by the Japanese botanist Akira Miyawaki in the nineteen seventies, this method involves choosing the plants best suited to the site, preparing the land and a high density of plants (three to five small trees per square metre), which makes for a faster rate of growth and a higher rate of carbon absorption, as well as being able to process rain water, improve air quality, reduce sound pollution and keep temperatures at a more comfortable level. Another mini forest has been created

using the same method in the heart of Lisbon, as an initiative launched by the Living Laboratory for Sustainability @ Sciences ULisboa. On a site in front of Building C2 of the University of Lisbon’s Science Faculty, what was once a lawn measuring 315 square metres, offering little potential for use and biodiversity, is not FCULresta: a dense, biodiverse and multifunctional mini forest, “designed to be showcase and living laboratory for students and researchers”. It is home to more than 600 plants, two insect hotels, a shelter for amphibians and another for reptiles, and sensors to monitor the soil. Other initiatives are springing up around the city, showing that local



1. City of Porto Park
2. Volunteers plant Lisbon’s first Fast Forest, in January, in Bela Vista Park, Marvila
3. Porto, Jardim da Cordoaria

the city, covering a total area of 25 hectares.

The municipal council is also using FUN Porto and the FUTURO programme to encourage people to plant native trees in the city, with a scheme that says “If you have a garden, we have a tree for you”. In the 5th edition of the programme, launched in March this year, residents and organisations in the city with gardens or yards can apply to receive up to 10 native trees and shrubs: arbutus, Portuguese birch, hackberry, hawthorn, cypress, wild apple and butcher’s broom. In total, 159 citizens and organisations were given 906 native trees and shrubs to plant in private gardens in the city, as well as 1,486 small Portuguese native plants for 265 terraces and balconies. These schemes set out to “transform Porto positively into a greener and more sustainable city” and, at the same time, are a way of acknowledging the role of local people in creating and maintaining the city’s green infrastructure. Because, even if it’s just planting a tree, everything counts. ●

people are increasingly aware of the issues involved. One example is the campaign/movement calling for “Trees on every Lisbon Street”, an idea promoted by Pedro Miguel Santos, a “country boy” who has lived in Lisbon for 14 years, seeking to “put pressure on the public authorities to plant trees on every Lisbon street”.

The FUTURE is in the trees

New green infrastructures are also on the agenda in Porto. The city council has been involved since 2014 in FUTURO, “a planned and coordinated endeavour by various organisations and citizens” with the aim of creating and maintaining native urban forests in the region, “which needs to enrich

its biodiversity, sequester carbon, improve air quality, protect its soil and contribute to a better quality of life for local people.” Overall, the aim is “reforestation of around 100 hectares of burned or vacant areas, or areas in need of rehabilitation, with approximately 100,000 trees of species that grow spontaneously in the region”. One of FUTURO’s flagship projects is FUN Porto, seeking to create urban native forests in the city through the “Porto Biospots Network”, a network of urban forests designed to “promote biodiversity, ecosystem services, adaptation to climate change and a friendlier landscape”. It will consist of 14 areas alongside main roads around



3. CAN UNCERTAINTY POWER PROSPERITY?

In the economy, companies and professional life, is uncertainty a limitation or a driving force for development? History teaches us it is clearly a factor for change. Provided it is faced with a clear head and careful planning. And teamwork.

Daniel Traça, director of Nova SBE

“We need new ideas to respond to a new world”

What times are these we are living through? What has happened to stability, in the economy and in our lives? The idea of context, and of history, might help to bring a better understanding of change and to find solutions for a way ahead we only know will have to be completely new. Daniel Traça has no doubts about the matter: “We need new ideas and approaches, or else we’ll never get out of this lake of black swans”.

Published in 2007 by the economist-turned-philosopher, Nassim Taleb, “The Black Swan” has become a textbook for interpreting some of the most significant socioeconomic phenomena of today. The “black swans” of which Taleb writes are sudden and very rare events, which society was unable to foresee, and for which it was unprepared, with significant impacts on the lives of people and the economy. “Events of this type are happening all around us, all the time, such as with the pandemic, the war in Ukraine, financial collapses, or the complete breakdown in production chains, and we’re not prepared to cope with them”, explains Daniel Traça, to underline what makes these events different: “As well as their huge impact, what is most noticeable now is how frequently they occur”. The director of Nova SBE traces the current upsurge in “black swans” back

to “three major structural changes” that started to take shape in the mid-nineteen nineties. The first of these, closely connected with the growth of the internet, lies in technological change, which is evolving fast and bringing widespread disruption. This is joined by a second factor, which is the general globalisation of the economy - partly the result of China’s newfound economic importance, and partly due to changes in Eastern Europe, developments that have substantially altered the geopolitical map. Lastly, the advent of climate change, which puts in jeopardy our very existence. As a result of these three shocks, the whole way we have organised the world since the end of World War II has been rendered unfit for purpose. “This affects institutions, the way we conduct competition policy, and also the way people saw their careers and their relationships with companies”, explains Daniel Traça. The institutions



- Director and full professor of the Nova School of Business and Economics (Nova SBE).
- Holding a PhD in Economics from Columbia University, New York, he has been a consultant to the World Bank and the European Commission and published his scientific research in several leading international academic journals in the field of Globalisation and Economic Development.

and organisational models “worked during those decades of extraordinary prosperity and growth, but they weren’t designed to cope with this exponential speed of technological development, with the disruption and tensions brought by globalisation, or with the issue of sustainability and climate change”, he points out. “The ‘black swans’ will continue to appear for as long as we are unable to generate new institutions that can restore a degree of stability; that would, for example, allow Ukraine and Russia to talk to avoid this type of conflict, that would allow us to find a new way of organising ourselves to manage successfully the global problem of climate change, or that would be useful in finding a way of approaching contemporary issues such as social media as spaces of social disruption and instability”, he tells us.

The institutions through which the world organises its social and economic affairs, built on principles dating back to the nineteen fifties, have been shown to be out of date in the face of the accelerating pace of unexpected events and their brutal consequences.

What now?

Daniel Traça identifies two urgent priorities: “We need to create a different organisational framework for our societies, new institutions that allow us to deal with all these unruly forces, all this chaos, and also to strengthen our own individual capabilities, and those of our organisations”. And one key idea: “This is fundamentally a new world, and we need fundamentally new ideas”.

The director of Nova SBE does not see this as an unprecedented or insuperable challenge for humanity. Contemporary history gives us very clear examples, such as the changes in the socioeconomic fabric after the Industrial Revolution, the political models that brought severe disruption

in the twentieth century, and the currents of thought emerging after the Great Depression of the 1920s, as well as the global and institutional reforms following World War II. The problem is that, since then, “thought, and economic thought in particular, has practically stagnated”. Today, Daniel Traça believes it is absolutely essential to bring back a “creativity that can offer new answers”. But, as a professor of economics, he “sees little in the way of new ideas”. Whilst in the business world, this almost amounts to a purge - “companies with a big idea survive, and those who fail to come up with one are pushed out” -, at state level, the need for reforms, in our approaches and solutions, is even more critical, because of how this affects the life of the world’s societies, as regards income redistribution, health care or national and international rule-making. “The ability to generate fresh responses to deal with this new world created by globalisation, technology and climate change, is even more important for states”, notes Daniel Traça. “And what we have today is a diminishing capability on the part of those in government to manage and renew, while we see the public losing their trust in institutions, which is directly connected to the growth in phenomena such as populism”. “If we don’t reset institutions so they can bring back some stability and predictability into people’s lives, we will travel towards increasing levels of despair, not least because our ability to cope with ‘black swans’ is limited, leading to cycles of fear”, he told us. Daniel Traça says nothing about this is inevitable. And the solutions are in our hands “We’ve been here before”, he comments, and concludes: “History shows us that, in the past, we’ve managed to move fast and deal with change. And the world that emerged from that collective mobilisation was always better”. ●

“Our current institutions weren’t designed to cope with this exponential speed of technology, with the disruption and tensions brought by globalisation, or with the issue of sustainability and climate change.”

When uncertainty acts as a trigger

The relationship between uncertain times and entrepreneurial creativity is well documented by history. Social scientists and economic thinkers have also made this clear over time.

In the past century, we have lived through several global crises that directly affected the world economic situation. The Great Depression, starting in 1929, pushed global growth into a record downturn of 17.6%, according to the World Bank. In the aftermath of World War II, in 1945 and 1946, the drop in output was 15.4%. In the present century, the financial crisis of 2007 led to a recession of 2.9%. More recently, the pandemic caused by Covid-19, exacerbated by the war in Ukraine, has already led the World Bank to review downwards its forecasts for economic growth in 2022, which is now 2.9% (as compared to 3.2% forecast in April, and 4.1% in January).

And yet, many of the corporations that are world leaders today were founded at times of recession. Several inventions that are part of our daily lives today - the wheel, the light bulb,

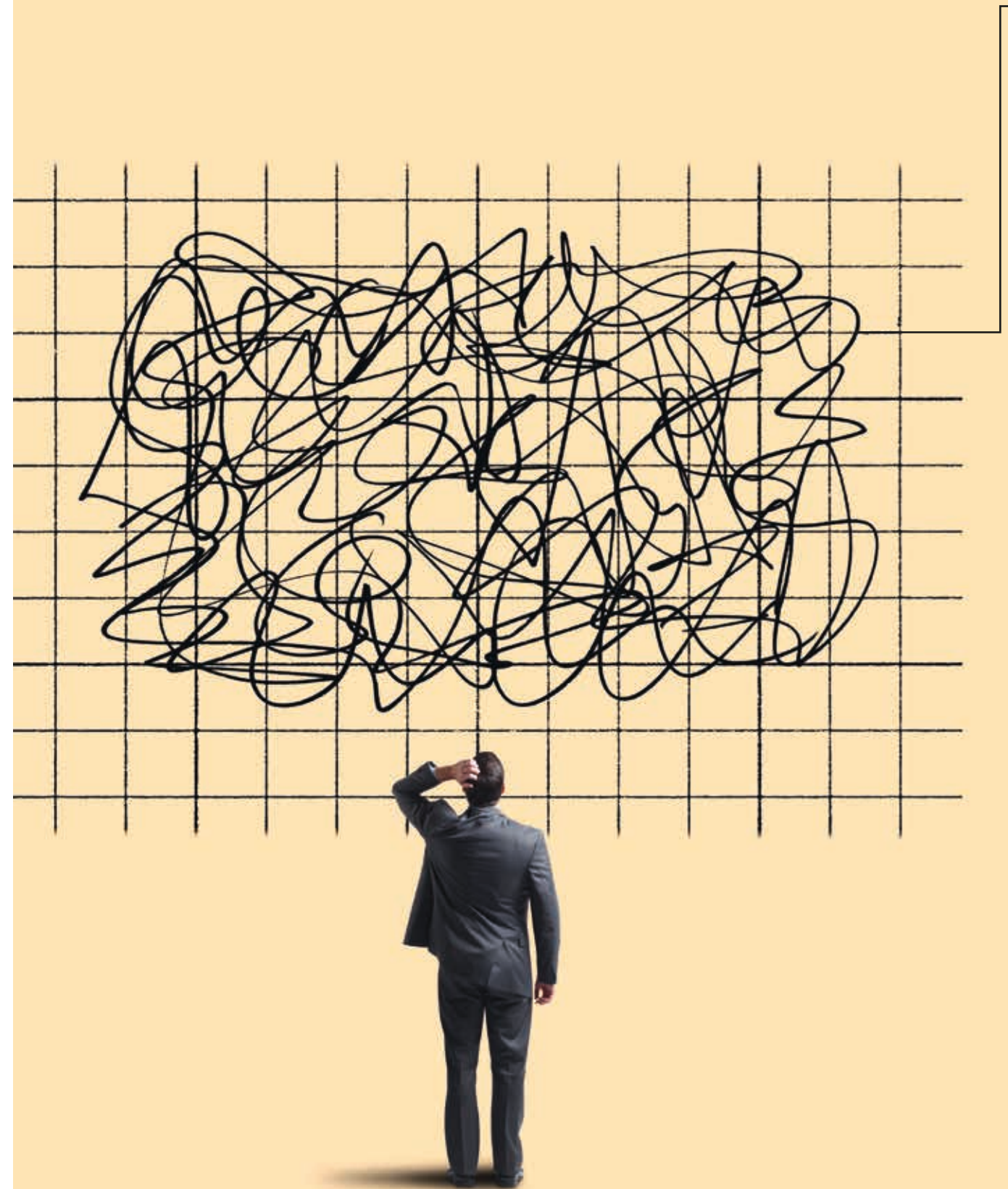
the printing press and many vaccines - came about in response to critical problems that mankind faced at a given moment. What all these flashes of entrepreneurial creativity have in common, is that the solutions they brought were not temporary. These new enterprises or inventions changed the world as we know it.

Radically different in their origins, and in the impact they had on society and the economy, the great crises of human history brought uncertain times but also speeded up innovation and were the catalyst for the entrepreneurial spirit.

In an academic article entitled "Entrepreneurial responses to Crisis"⁽¹⁾, Gary Dushnitsky (London Business School), Melissa E. Graebner (Gies College of Business, University of Illinois) and Christoph Zott (IESE Business School, Barcelona) remind us

that "every crisis brings the seeds of renewal". And they cite the economist and political scientist Joseph Schumpeter (1934) who observed that a crisis represents "spontaneous and discontinuous change (...) which forever alters and displaces the equilibrium state previously existing", giving rise to opportunities for innovative goods, new markets, transformation of production methods, new sources of supply and "new organisation of any industry". "These tenets - the authors argue - undergird Schumpeter's famous Theory of Creative Destruction, which postulates that entrepreneurs are key actors in establishing a new equilibrium, creating prosperity and social wealth from the ashes of the old, destroyed equilibrium. They also suggest that crises and opportunities, from an entrepreneur's point of view, are two sides of the same coin".

Many of the corporations that are world leaders today were founded at times of recession.



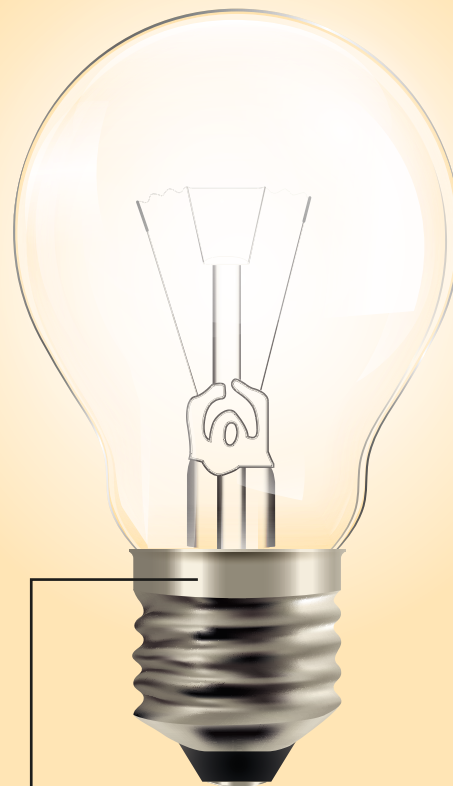
“The positive impact of a crisis is that it opens up new opportunities that entrepreneurs can respond to effectively.”

Steven Pattinson and James A. Cunningham

The response to the pandemic

The Covid-19 pandemic prompted researchers in the social sciences and economic thinkers to explore enterprise in times of crisis or uncertainty, and the article by the economists cited above is one example of this. Whist far from being a new topic, it allows us to gain a more contemporary, and scientifically anchored, perspective on the old maxim that reminds us that, etymologically, ‘crisis’ derives from the Greek word *krisis*, meaning ‘decisive moment’. Or on the familiar allusion to Mandarin script, which composes the word in two characters, one presenting ‘danger’ and the other ‘opportunity’. “The impact of Covid-19 brought into focus the immediate and long term challenges that the industrial, public and NGO sectors have to face in order to survive and grow”, point out Steven Pattinson and James A. Cunningham, in their paper “Entrepreneurship in times of crisis”⁽²⁾. The authors stress that a crisis can have positive and negative impact on entrepreneurs and their businesses: “The positive impact of a crisis is that it opens up new opportunities that entrepreneurs can respond to effectively”. And a central idea on the benign consequences of enterprise

for society as a whole: “In a broader sense entrepreneurs play a crucial role in helping economies overcome crises through the generation of innovations that support, inter alia, new ways of working. Post-crisis this may result in an entrepreneur having a more robust business model, resilient company culture and collective organisational learning of how to deal effectively with a crisis”. In other words, entrepreneurs might find themselves “even better prepared for future crises”. The scientific literature is extensive and varied when we seek to learn about the virtuous relationship between crises, enterprise and innovation. But the reflections quoted above will be enough to stop us putting “uncertainty” and “obstacle” in the same sentence. ●



(1) <https://onlinelibrary.wiley.com/doi/full/10.1002/sej.1383>
 (2) <https://journals.sagepub.com/doi/full/10.1177/14657503221097229>

Against the odds

Major corporations, such as Disney (1929), Hewlett-Packard (1939), FedEx (1973) and Microsoft (1975), were founded during economically and socially troubled times. More recently, in the wake of the financial crisis of 2008, other emblematic names have established themselves: Uber and Airbnb.

One classic example of creativity and enterprise in uncertain times was that of Disney. In 1928, the brothers Walt and Roy Disney introduced the world to the now immortal Mickey Mouse, in the short animated film “Steamboat Willie”. One year later, in 1929, at the start of the Great Depression, which was to last almost four years, the duo founded Walt Disney Productions. The brothers knew that America needed a smile like never before. They faced up to the challenges, built up their business, and presented the first animated feature film just as the country emerged from that dark period.

The story of the Airbnb accommodation platform is another that vividly illustrates the creativity rooted in the entrepreneur. In 2008, Brian Chesky and Joe Gebbia, designers by trade, were sharing a house and finding it hard to pay the rent, so they started to think of a way to boost their income. They realised that an industrial design conference was due to be held in San Francisco, and all the hotels in the city and its outskirts were booked out. Seeking to attract conference participants who had not managed to book a hotel, they installed three airbeds in their house, renting them out with breakfast included. To do this, they created the airbedandbreakfast.com.

Buoyed by the success of their venture, Brian and Joe realised they ought to develop the idea. They sought help from an IT expert friend to set up an online booking platform and to introduce it to people wanting to share their own houses. When the website was ready, the Democratic Party held its National Convention in Denver, causing all the available accommodation to be fully booked, which led to hundreds of bookings on the new platform.

They were on their way to success, and despite the financial crisis, investors soon flocked to support the company. At the start of 2009, an investment firm injected 600 thousand dollars into the venture. From three airbeds in 2008, Airbnb grew to six million active accommodation offers at year-end 2021, over 220 countries. ●



Creativity with a purpose

Faced with instability and structural changes on a global scale, The Navigator Company has responded with a clear focus on the future. The “From Fossil to Forest” agenda is one of the most recent milestones along this road, combining entrepreneurship with purpose.

Innovative tissue products, a range of packaging papers offering an effective and safe alternative to single use plastics, and now fresh impetus for its innovation agenda, known as “From Fossil to Forest”: the past two years have seen Navigator set sail into a new era of investment, innovation and diversification. The company has responded to a series of critical events of global magnitude – the pandemic, war in Ukraine and the disruption of logistical chains – by seizing this as a key moment to position itself as “a bioindustry on the right side of the future”. Navigator has chosen to invest, in order to respond to new opportunities for forest-based products that can substitute fossil-sourced materials. This is a strategy aligned with the aim of creating a positive impact on society and that embodies the company’s corporate purpose, which proclaims its “commitment to creating sustainable value, leaving a better planet for future generations, through natural products that are sustainable, recyclable and biodegradable, that help to sequester carbon and produce oxygen, that protect biodiversity, improve the soil and combat climate change.” One of the most recent steps on this strategic journey was the approval by the Recovery and Resilience Plan (RRP) of the From Fossil to Forest agenda for sustainable packaging products to replace fossil-based plastics, led by Navigator Paper Setúbal. The projects grouped under this agenda range from production of high yield brown pulp (HYKEP) to manufacture of innovative packaging, with barrier properties enabling

them to be used in the food sector. There are also plans for producing molded cellulose to substitute single use plastics and for developing composite materials. In total, the From Fossil to Forest Agenda is expected to result in 17 high value-added products, and also in the creation of well-paid skilled employment: 102 new jobs are planned, including 49 highly skilled positions. As the consortium leader, Navigator and its R&D institute, RAIZ, have accounted for the bulk of the investment – a total of 93.2 million euros, representing 79% of the total budget for the RRP Green Agenda for Business Innovation. Navigator submitted six applications to the RRP and took part in a further five consortia led by other organisations. Over a period of five years, it plans to invest in the order of 266.6 million euros. It may be recalled that Navigator launched its new range of packaging papers (gKraft) in 2021, a year when the economy felt the brunt of the pandemic. This new product was a global pioneer, using virgin eucalyptus *globulus* pulp to substitute the single use plastics that dominate the packaging market. This breakthrough was the result of research, development and innovation programme led by a multidisciplinary team and supported by RAIZ. The same year also saw the launch of innovative products in the tissue segment, such as Amoos® Naturally Soft, offering a high standard of softness without using chemical bleaching agents, Amoos Aquactive™, incorporating soap, and Amoos Air Sense™, with a perfume activated every time it is used. ●



Sustainable solution for aviation



It is one of the most innovative projects for decarbonising air travel and relies on Navigator’s sustainable forests as part of the solution: in 2026, in Figueira da Foz, a state-of-the-art industrial unit will produce non-fossil aviation fuel. In order to achieve this, The Navigator Company and the German company P2X Europe signed an agreement in principle in July for a joint venture called P2X Portugal, for large-scale production of e-SAFs (e-Sustainable Aviation Fuels) – carbon neutral synthetic jet-fuel (kerosene), produced from green hydrogen and biogenic CO₂. This venture will take advantage of Portugal’s highly competitive position for production of renewable energy (solar and wind) and of biogenic CO₂ generated by Navigator’s biorefineries, which use sustainable forests as their resource. Together, these are the two crucial elements for successful industrial-scale production of net zero (carbon neutral) synthetic jet fuels, with a view to decarbonising the aviation industry. P2X Portugal’s end product (eSAF) will therefore be the result of a fully sustainable manufacturing process, whereby the company will in practice store solar and wind energy in a synthetic liquid fuel. Sustainable Aviation Fuels (SAF) based on Power-to-Liquids (PtL), also known as eSAF, are the most important lever for decarbonising the aviation sector. eSAF obtained from PtL, generated from renewable electricity and biogenic sources of CO₂, such as P2X Portugal will produce, is especially promising, as it cuts carbon emissions by 90 to 100%, in comparison with conventional aviation fuel. ●

The ability to cope with uncertainty is essential in managing a business. The strategies depend on the particular sector, and the business context, but there are underlying key factors that position people in organisations to rise more effectively to the challenges. The people we chose to listen to were not business gurus or economists. And we also decided to dispense with “case studies”. What we wanted was to understand the human factor in dealing with uncertainty. How to overcome it and turn it into an opportunity. We spoke to a university student, an athlete, an actor, a surgeon, a researcher, and an airline pilot. When we broached the subject of “uncertainty” with them, what they had in common outweighed what made them different. The uncertainty that exists but is never confused with losing control. That never slips into chaos. Preparation, focus, and high standards are strategies for success, along with a deep respect for the power of teamwork.



Patricia Mamona, athlete



Helena Freitas, lecturer and researcher



Ana Sofia Martins, actor



Nuno Figueiredo, surgeon



Sílvia da Silva Pereira, airline pilot and captain



Beatriz Fernandes, medical student

The importance of the

HUMAN factor

Patrícia Mamona, athlete

“I’m comfortable with being uncomfortable”

Patrícia Mamona has a clear idea of how an uncertain outcome makes her run faster. Her experience of top-level competition has also been a journey of self-discovery: “The athletes who manage to get out of the box are those that evolve most”.

Tokyo, Olympic Games, 2021. One year later than planned, because of the pandemic, lockdowns and a world turned upside down. But the precise moment at which we are now is the triple jump that will win Patrícia Mamona her silver medal. And where the first leap is in the mind. Releasing the body from the chains of worry and uncertainty. From the months at home not knowing when she would train again. Right now, in front of her, stretches the track, the run and the jump. It’s tunnel vision. It’s “thinking of nothing, literally”, the athlete tells us. How can you think of nothing? Patrícia Mamona remembers her Olympic jump: “I was so centred on that moment that it was perhaps the first time I managed to think of nothing. Only of that time and space, that jump”. So that when she “landed” in the sand pit, after flying 15.01 m through the air, she didn’t immediately realise what she’d achieved: “My first reaction was that I’d done nothing special; only afterwards, when I saw the mark, did I realise what I’d managed to do”. Her silver medal was Portugal’s best ever result in the women’s triple jump. This episode shows how, for a top-level athlete, the starting pistol feels like the moment they’ve arrived. Because leading up to that is a lifetime of

preparation, “perseverance and hard work”, as she tells us. That “thinking of nothing” did not come from nowhere... “It was largely due to the work of mental preparation, including meditation”, which she includes in her training routine. In Tokyo, her psychological preparation, complementing the physical training, enabled her to cope with the anxiety and uncertain outcome, an inevitable state of affairs in athletics, sport and nearly everything in life: “During the event, I was focused on that moment. That’s all. I thought- ‘I don’t have a particular target, it’s just to jump as far as possible’”.

Plan, prepare, keep going

If we look back to where it all started, Patrícia Mamona’s life is a continuous story of focus on objectives. Aged eleven, she would sneak out of the house to go running. She trained secretly because her parents had rather different ideas for her future. They would have preferred her to focus on her schoolwork, as the route to a career and a comfortable life. And she was even good at school: “It sounds crazy, but I was always a good little girl and so I didn’t want them to find out that I was doing something different from the plans they had for me”, recalls Patrícia Mamona, who can now look back and see the funny side: “Even back then I had to rely on good

planning, to sneak out of the house without getting caught!”. “The truth is that I knew that was the only thing that was right for me”, she reflects. “I always saw athletics as an expression of who I am. I did karaté, ballet, I was also good at football, but I always saw something in athletics that made me say ‘this is me’. And I went after that”. “Everything I’ve done has been from the heart”, she explains. “For example, at the start everyone said not to go into the triple jump because of my height, but that was what I wanted, it’s what I felt”, says the athlete, just 1.66 m tall and holder of a Portuguese record of 15.01 m. From the days she would go running in secret from her parents to the years she lived alone in the United States to study medicine, Patrícia Mamona appears to have embraced her challenges: “I love being out of my comfort zone. And uncertainty has that gift... I’m comfortable with being uncomfortable”. And she is very clear about her ideas: “The athletes who manage to evolve are those who are able to get out of the box”.

The uncertainty that makes you run

Patrícia Mamona deals with uncertainty as a process of building something and never as a limiting factor: “I always keep hold of the



positive side and the possibility that it will turn out OK. In that respect, uncertainty never limits me, instead it makes me work harder”. Experience of high-level competition has been crucial. The fact of working “without any guarantee of this or that outcome, it ended up preparing me for the rest of my life, for the uncertainties we all have to deal with”, she tells us, giving the example of everything that happened during lockdowns - the

terrible impact they had on the strict routine of an elite athlete: “I have a very clear idea of the importance of thought and preparation, so I focused on developing a mindset for that situation and thinking how I could cope with it”. And the ability to look at things as an opportunity: “I knew that was the ideal time for me to prepare - to acquire new skills to cope with that crisis and that uncertainty. How can I train at

home? How can I adjust to it? I had to search around, be more creative. At these times, we have to develop new tools to face things that are also new.” “People ask me how I manage to be so positive, and I say that at those moments of uncertainty I’m developing as a person and as an athlete. I’m learning about myself. If I’d never been exposed to that sort of thing, I would new know what I do today”, she concludes. ●

“I always keep hold of the positive side and the possibility that it will turn out OK. In that respect, uncertainty never limits me, it makes me work harder.”

Helena Freitas, lecturer and researcher

“Science has a commitment to society”

Science arises from the need to find answers, so scientific research doesn't exist without the stimulus of uncertainty. Might the troubled and difficult times we are living through offer the perfect conditions?

History teaches us that the power of scientific knowledge depends on cycles, the moment, different stimuli that come from society. But it's always there. Helena Freitas, researcher, full professor at the University of Coimbra and director of the Serralves Park, with a long career devoted to studying ecology, corroborates precisely this idea: “Even when stability is lacking in society, science doesn't stop”.

And you don't need to look far into the past: “The pandemic showed us that science can bring solutions. The results in Portugal were extraordinary, there was a lot of confidence and an injection of credibility for scientific endeavour. People want more science and believe more and more that scientific knowledge offers the solution to the challenges facing the world”.

But the uncertainty from which science starts out can paradoxically be a difficult factor for those working in it. Starting with teaching. “It's fundamental to maintain the research teams, attach value to critical density, promote approaches that are more systemic, more interdisciplinary, to write articles. That's the essence of science. And, for that, you need to support your best qualified resources, hold on to people and not lose expertise”, argues Helena Freitas. “It's not critical whether we get funding opportunities, whether we win projects, that's never the most

important thing”, she adds, stressing that “what matters is to find a way to extract from the thinking of those persons, as far as possible, a latent framework of uncertainty about the future”.

Uncertainty exists, but it is not paralysing: “Students already live and grow with uncertainty, but they're ready to find solutions. They don't stop, because they have the dream of a life and don't want to be held back”. And how will these new generations of researchers cope, in their daily lives, with another focus of uncertainty: the globalisation of information, a lot of it of questionable validity or even incorrect? Helena Freitas draws a line: “There is a set of principles that remain valid, and which guide scientific practices. Internal control, scrutiny and validation are something that can never collapse. Growing commercialisation and occasional attempts at manipulation are combated by an active principle that mobilises the scientific community, which is to stand up to dishonest thinking”.

Strong values and robust institutions.

Ethics are a fundamental component in the exercise of science. This is another point that Helena Freitas raises: “Sometimes the most important thing is to explore an avenue that responds to what society really needs, even if this creates a negative impact in other areas. You

have to weigh things up. There is a framework of values that has to be supreme, so that we take the fairest decision, best suited to our times”. Over her long career, Helena Freitas has also acquired a clear idea of the importance, especially at times of uncertainty, of maintaining strong and influential institutions, able to take important steps with a real impact on people's lives.

The researcher makes a point of recalling “the process of consolidation we saw after the Second World War, and that made us grow within a framework of global coordination”. And she explains the impact of this phenomenon: “It created in us an illusion of stability and, when that stability is rocked, that affects all of society and our attitude to things. This is aggravated by all the issues relating to natural resources, which require a paradigm shift and for which we urgently need answers”.

She concludes by stressing that “it's unthinkable to allow anything to undermine key institutions, like the UN and UNESCO. These are organisations bursting with positivity and that offer credibility, because of their legacy. They have succeeded in building an agenda of progress, development, closeness to communities, putting the collective interest before the individual, defending peace rather than war. The choices those organisations have made for the common good are valuable and really matter”. ●



Ana Sofia Martins, actor

“If we don’t do something, nothing happens”

Ana Sofia Martins grew up facing down uncertainty. Today, at the age of thirty-five, she likes to have uncertainty around, because that’s what encourages her to leave her comfort zone. “We have to make room for new things to emerge”, she says.

She talks to us confidently and frankly, and is candid about having to live without her mother from the age of five. “The first moment of real uncertainty I can remember was the night when my mother decided to leave home”, recounts Ana Sofia Martins. And she remembers how her father wasted no time in adapting. “I was lucky to have a very pragmatic father. With a couple of decisions about basic things, life went on.” Thanks to the determination of her father and help from people close to them, Ana Sofia and her brother continued to make their way with hard work, talent and the ability to take tough decisions. Aged fifteen, she was invited to start a career as a model, which was to open doors to the next stage in her life. She got to know other countries and people, won prizes, became a famous face. She achieved success and recognition. Ana Sofia points out that she resisted resting on her laurels: “In modelling, there’s a lot of competition, and nothing would guarantee that they would choose me over someone else for a particular campaign”. Knowing this made her eager to have more to offer: “I didn’t want to be just a pretty face that people thought was nice”.

What she wanted, as people say today, was to “scale up”. Her love of reading helped her with new skills. That and a desire to “pay attention to the world”. Or, as she puts it: “I never wanted to be someone with no ideas”. “For me, uncertainty is just the start of something different, a new phase that begins. We should never think we’re coming to the end. I created a spirit of survival that stays with me, but also the conviction that there will always be a solution”, she reflects. Just over two years ago, she deliberately chose to let things get less clear. She had an exclusive contract with a TV channel which offered her security, but she decided to pull out. “Some people think life is about going from point A to point B”, she explains, adding: “There’s the most obvious route, but then there are others, that look like a detour, but they leading to hidden opportunities, fantastic places. Sometimes it’s good to go and discover them and, who knows, not even come back to find what we thought was the main objective. You have to know how to enjoy the journey!”. This was the detour she decided to make. “If we don’t do something, nothing happens; and I don’t wait for someone else to do it”, says Ana

Sofia Martins. “We have to make room for new things to emerge. Face the uncertainty willingly and pragmatically and move ahead”, she tells us. In this case, her goal was clear, and she had prepared for it. Her recent career as an actress shows that it has succeeded. “If I’d stayed, the wonderful things that have come my way probably wouldn’t have happened. I did an international series, with major actors, I had the chance to work on other channels, with other people, to discover new ways of seeing and going things”.

Exploit your emotions

Ana Sofia subscribes wholeheartedly to a line from the international series on which she worked, called “Devils”, uttered by one of the lead characters: “We don’t fear change, we make it”. In her time as a presenter, she was also temporarily in charge of one of the so-called “afternoon shows”, a very different experience: “It’s a very specific audience, we have to adapt how we communicate. It was challenging in terms of the issues, a lot of uncertainties in people’s lives, which generate emotion. A live show, where we’re dealing with the real lives of people, it’s not a controlled environment, the unexpected happens”.

“For me, uncertainty is just the start of something different, a new phase that begins. We should never think we’re coming to the end.”



If we think of the rollercoaster of emotions to which humans are naturally subject, people often wonder how far actors are able to detach themselves from their own state of mind and not let it seep through into the character they play. Ana Sofia has a different approach and talks about it plainly: “Sometimes it can even be useful if we get out of bed on the wrong side. Whenever this happens, I look at the scenes I have to film that day. If the character’s state of mind is the same as my own, then it all comes out very naturally. I make good use of my bad moods. I may as well make the most of them!” Ana Sofia Martins’ childhood brought her a natural tendency to try to control everything around her. She confesses that she felt the need to have therapy to get over this. “I always say that my life divides into BT (before therapy) and AT (after therapy). It was really good, because it taught me that I don’t need to control everything. It’s no longer such a big deal for me.” And she gives an example: “If we decide we’re taking a fortnight’s holiday, the first week is planned my way, and the second how by husband likes. It’s deliberate and we agree on that. So, the first week is all planned in detail, and the second is complete improvisation, because he’s the opposite of me in this, he’s much more easy going. What’s happened is that in the second week there’s more room for fun and unexpected things to happen, some of which are fantastic. I think we should learn to live with unpredictability, controlling everything is an illusion”. ●

Nuno Figueiredo, surgeon

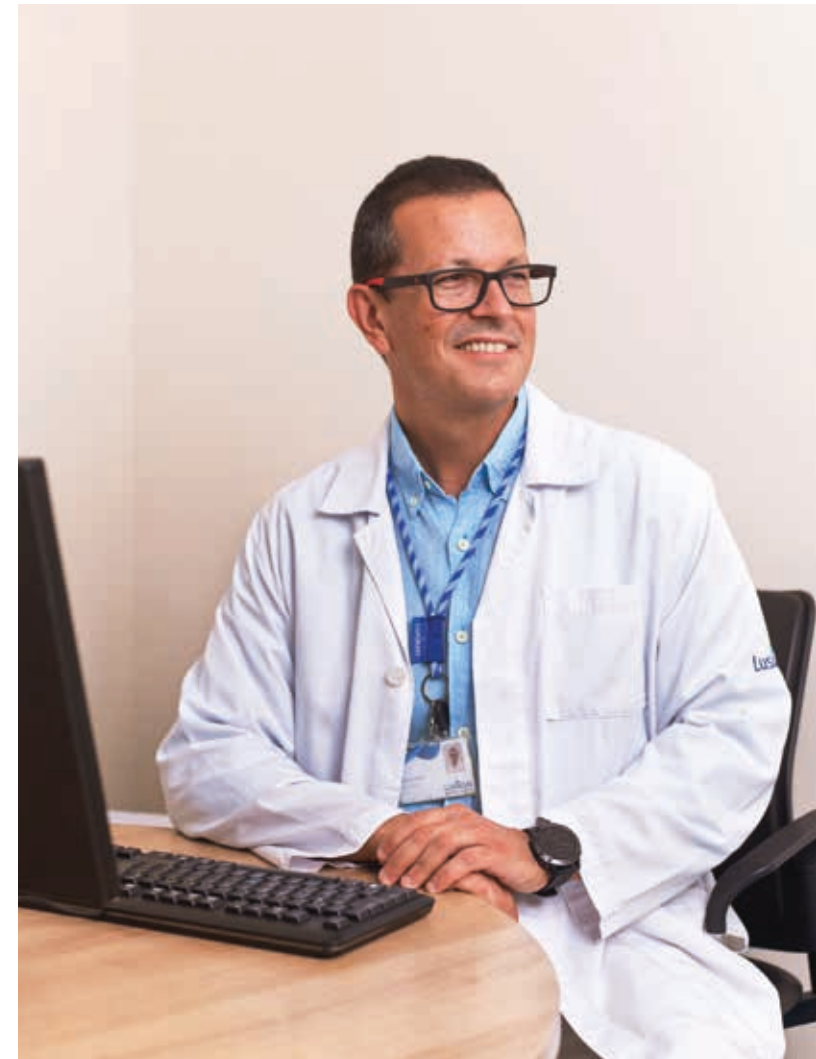
“Uncertainty and the ability to overcome it have been a driving force for progress in medicine”

Ritual is part of a surgeon's life. The actual act of hand washing before entering the operating theatre has the solemnity of reflection and pause. None of this is just going through the motions. It's a process of focussing the whole team on a matter of life and death.

Anatomy is not always the same. And the same clinical condition can evolve in different ways, from patient to patient, or even in the same person over time. So, the everyday life of a surgeon is made up of strategies to limit uncertainty. Because there are always and inexorably just two possible outcomes: “Either the patient improves, or does not, after the procedure”, as Nuno Figueiredo sums it up. Currently coordinator of General Surgery at the Lisbon hospitals run by the Lusíadas Group, oncological and colorectal surgeon, Nuno Figueiredo was the first director of the Surgical Centre at the Champalimaud Foundation and has published extensive scientific research, focused on treating colorectal cancer, winning him the 2013 Pfizer Prize for Fundamental Research. This vast experience and the delicate balance in his speciality don't stop him from reflecting on an everyday challenge: “Surgeons are faced with uncertainty every day”. For this reason, the procedures for mitigating it are part of the profession.

The complexity of pathologies, and the specific features of each case, require “a highly adaptative approach, starting out from a standard with which we are familiar, and know to be the most correct, assessing and measuring deviations from this”. The route whereby a medical professional qualifies to take charge of an operating theatre is the first clue to the high standards and pressure that await him or her: the training takes ten years to complete, divided between academic studies and hands-on training. Over their careers, the succession of decisions they will have to take means they can never detach themselves from constant preparation and focus. “It all starts with the diagnosis and the phase of planning the procedure”, as Nuno Figueiredo explains, stressing that the training consists of “a multidisciplinary, collegiate process, involving several specialists, or different interpreters of the same reality, who come together in a great team to help the parties overcome the situation they face”. A surgeon “never works alone”, he is eager to point out. And then the moment for the surgical

procedure arrives. “That day, entering the theatre, there's a sort of mental preparation for what will happen”, says Nuno Figueiredo. Once again, the idea of using the standards as a beacon of high standards: “Surgeons are very ritualistic, they try to follow a standard pattern they themselves recognise for approaching the surgery”. So before going in, the team is introduced again, they once more discuss what's been planned and what will be done. In short, they check they're all on the same page. And of course, that they're all focused. “The actual moment of hand washing is a ritual that helps with this mental preparation”, he reflects. Entering the theatre is preceded by “a moment which is like a pause, for reflection and concentrating on doing the job”. “It's something - he explains - that enables us to get the whole medical and technical team united in the same goal, to which they are to devote the next few hours. It's focussing on it together”. As teams are made up of people, it is important they leave all their other worries at the door. The theatre is sterilised, off limits to any subject other than that procedure



and that patient. Even the form of communication is different: “Each instruction given is repeated by the person receiving it, to ensure it has been clearly understood”, says Nuno Figueiredo by way of example. These “rituals” are not there by chance. They're part of the good practices laid down by the World Health Organisation. “The central aim of these checklists, and all the preparation, is to focus the entire team so that each one is as efficient as possible in his task and to detect

“The moment of reflection and concentration when going into the operating room is something that enables us to get the whole medical and technical team united in the same goal. It's focussing on it together.”

any deviation from standards as quickly as possible”.

A driving force for progress

“Uncertainty”, as is becoming clearer, is a driving force for the highest standards. Here too, Prof. Nuno Figueiredo is extremely qualified to speak. “In medicine, and in surgery in particular, uncertainty and the ability to deal with it have been a driving force for scientific and technological progress”, he says unhesitatingly. He is a surgeon who can boast of considerable experience. After training in advanced laparoscopic surgery in Belgium and working for a year as honorary consultant surgeon at the Minimally Invasive Colorectal Unit at Queen Alexandra Hospital in Portsmouth, he became a certified robotic surgeon in December 2015 and a member of the English Royal College of Surgeons in March 2017. Today, at his current hospital, he works closely with robotics. “Digitisation” of the surgical process, as he prefers to call it, as there is no actual autonomous robot carrying out the medical act, has made possible huge advances. “What we've done is to add layers of sensitivity, definition and precision, and that is part of this process of reducing the uncertainty”, he stressed, going on to add: “The entire team is more comfortable, because they are sitting ergonomically, which enables them to be effective, to focus and to concentrate for longer. And this is fundamental at a time when procedures are increasingly precise and complex, and also take longer”. Even when talking about robotics, Prof. Nuno Figueiredo is still mindful of the human factor: “Teams are made of people - he says again - and everyone has good and bad days. Managing a team is also a matter of identifying what is happening, either at a meeting, or during a surgical procedure, and often adapting things almost from minute to minute, in order to bring out the best abilities of each member of the team”. And that, the surgeon concludes, “is crucial”. ●

Sílvia da Silva Pereira, airline pilot and captain

“You can’t have screens in team communication”

An orchestra in tune, playing as one, in which each player knows their instrument. And when to play it. A team “without screens”, in which everyone is encouraged to talk. You might not think so, but we’re talking about aviation. Of the best that it has to teach us.

Captain Sílvia da Silva Pereira is an aviation enthusiast, which led her, after graduating in Aeronautical Engineering and acquiring professional experience, to make the extra effort and sacrifices to get her airline pilot’s license. “That course was my focus, by goal, my great aim”, she recalls. She started to fly in 2005 and today, when she thinks about the process of continuous construction which is the pilot’s job, she says without a trace of doubt: “After 17 years in the same profession, no one is the same person”.

“Aviation is about knowing the aircraft and its systems, and that’s essential, but there’s also the human factor”, says Captain Silva Pereira, adding that “over the years, we build up valuable experience in managing teams”. It’s a job “where you never reach the peak. We’re constantly seeking to do better”.

Aviation has a lot to teach other areas of activity, including good leadership practices. Starting with the extraordinary ability to learn from mistakes

Crew Resource Management (CRM) is the most significant example of this

process of continuous improvement, and perhaps the greatest achievement of modern aviation. Made up of a series of procedures designed to promote efficient teamwork, in order to ensure safe operation, CRM emerged in the nineteen seventies when accident investigations suggested that many of those events might not have resulted from technical malfunctions in the aircraft, or from a lack of piloting skills, but from the inability of the crews to respond properly to the situation in which they found themselves.

Poor communication between crew members led to the problem being wrongly appraised, to failings in teamwork and, in the last analysis, to decisions or a series of decisions that resulted in accidents. What is called “human error”.

“Over the years, experts in the world of aviation, pilots, engineers, psychologists and doctors set up working parties to examine what happened and to develop process that would avoid accidents being repeated. In aviation, we can’t afford to sit back and do nothing”, explains Captain Sílvia da Silva Pereira.

Communication is the key word in

the approach to efficiency and safety.

“Communication is important in all its form, what is said, how it’s said, when you say it”, she stresses, putting the emphasis on what she says, using an aviation term, is mandatory: “Communication between everyone has to be open and linear, in other words, it place all team members on the same level, including the captain, the person cleaning the plane between flights, the baggage operator, because they all contribute to the chain of events involving a flight”.

Beyond the aircraft

Because of this, CRM applies not only in the plane: “It extends to the whole company, because everyone influences the flight. It’s maintenance talking to the line, the line talking to cabin crew, cleaning staff talking to the captain and drawing attention to something they’ve seen in the plane... people have to be able to speak with whoever they think needs to hear. I have an open door to talk to my director-general and report, for example, that we have a problem in the destination airport and that this will cause delays. I don’t have to book a meeting on a given day to resolve something

“The communication has to flow, sideways, on a level, without barriers, so that problems are sorted out or, above all, so that they’re anticipated”.



that’s happening now”. In aviation, preparation is multiplied by the act of communication.

In essence, she says, it’s like any other company: “You can’t have screens in communication. It has to flow, sideways, on a level, without barriers, so that problems are sorted out or, above all, so that they’re anticipated”. The basic principle is that “you have to give people the chance to contribute, here and now”.

We spoke to her a few hours before she was due to fly a hundred or so passengers to Dusseldorf, and she explained that her daily life is a matter of managing efficiency and talent, and full communication. Preparation, planning and detailed projections are the first stage, and then these are shared: “I have a meeting with my co-pilot on flight dispatch, where we discuss factors such as technical issues with the aircraft, cargo contingencies, airport questions, the flight plan, the weather forecast for the route, and other things”. And then the cabin crew, a team briefing, “where we tell them about the details of the flight, such as the duration, whether or not we expect turbulence, a review of safety procedures or specific things like when we have a group of fans whose group dynamic might require more attention from the crew, just to give an example”.

It’s the captain’s job “to manage this team, as a conductor leads an orchestra where each player knows exactly the instrument he has to play and when he has to play it”, explains Sílvia da Silva Pereira.

Aviation is much more than the closed ecosystem of a plane. Flying, every day with the responsibility for hundreds of passengers, also means navigating human relations. ●



Beatriz Fernandes, medical student

“I like to have everything under control”

The fourth year of her medical studies, just starting now, will be another step in her career as a high-flying student. But Beatriz Fernandes doesn't see herself as a genius. What sets her apart, she says, is her great ability to focus and huge motivation.

She completed secondary school with an average of 20/20 and a score of 19.5/20 in her national exams in Portuguese and Maths. And yet, she says, she didn't study a lot. That came later, in her first year of medicine, at Lisbon University, where she was admitted in the academic year 2019-2020. Until then, she divided her time between the demands of school and her sports club. “I used all my spare time to study, but the fact is I didn't have much free time. I did synchronised swimming, training five days a week, three to six hours at a time. So I spent 25 to 30 hours doing sport, if I include travel and time in the changing rooms. And I also had guitar classes. I did my homework during the breaks at school or at the pool, and on Saturday afternoons and Sundays”, she tells us.

As well as managing her time almost down to the minute, she was helped by two crucial character traits: “More than being intelligent, it was important to be highly focused and extremely motivated. Those are my two defining characteristics and they got me where I am”, she explains. So, she never felt the need to sacrifice her social life to her school books, she never hesitated: “I'm not saying it wasn't hard, but I simply did what I had to do”, she says. The reward was achieving her goal: a free choice of what to study and what university she was to attend for the next few years. “I managed to reduce

the uncertainty factor about going to university. I like to have everything under control, to know what's going to happen and to be ready for it.” High marks were the means to achieving her goal, but also almost a point of honour: “The marks students get don't always reflect their potential. I didn't want that to happen to me”, she tells us.

The reverse

Her degree course was a new world of growth and challenges. Much greater than Beatriz had imagined. Halfway through the first year, the pandemic lockdown added a significant dose of uncertainty to her life and she felt the sense of control slipping away as never before.

“At that time, all I did was study, study, study. I didn't have my swimming, so there were no limits to how long I studied. I was overburdened with work, on the one hand, and isolated at home, on the other”, she recalls. “I started to get very anxious and no longer enjoyed the learning process as I had before”. Over the endless hours focused on course modules she was eager to complete with the highest possible mark, her doubts mounted up: “I didn't know if I could stand it, or even if that was actually what I wanted to do. My new group of friends, my fellow medical students, helped me through those difficult times. We talked about our anxieties, and I understood I wasn't alone.”

Time and experience have brought her a more balanced attitude to her studies. “I gradually realised I had to set limits for myself. I was in a prison, I had no life other than university. My best traits, which had got me on to the course I wanted, had also put me at risk”, she believes.

The change actually brought a surprising revelation: “I discovered that taking it a bit easier with my studies didn't mean settling for lower marks. If I study without limits, all the hours I can take, might get a 16. But if I study a bit less and sleep a bit more, I might get 18”, she explains. “I have better results that way. I've had a better average this year than in the second, and better in the second than in the first. And I can say I have a good average mark!”

As well as the power of rest, Beatriz has discovered that close friends can work as a real team. Although study might appear the world's most solitary occupation, and exams are something you have to face individually, she learned something new: however brilliant we are, without others we'll always be weaker. To students now starting at university, Beatriz can say what no one told her: “You can't take a medical degree alone and you can't do it just by studying. You need people who help each other, share their anxieties and worries with their fellow students, and sometimes you need to relax. Studying medicine is much more than just books.” ●

Youthful ideas for a healthy planet

With the impact of climate change, a young generation of eco-entrepreneurs is emerging and making real changes for a better planet. Portugal offers examples of this fresh take on regenerating the natural world.

Research findings prove it: younger people list defending the planet among their main concerns and are determined to show it through what they do. A recent study by Deloitte, “Millennial and Gen Z Survey 2021”⁽¹⁾, has for example shown that environmental issues are the third largest concern for millennials (born between 1981 and 1995), whilst generation Z (born between 1995 and 2010) regard it as their main priority. The survey questioned around 15,000 millennials and 8,300 Gen Z youngsters from 45 countries, and also included that these generations are committed to making life choices consistent with their environmental values: more than a quarter of respondents said that the environmental impact of companies had a direct influence on their consumer choices.

But there’s more evidence. Another recent study, The Youth Change Makers Report⁽²⁾, asked 13,886 young people aged 15 to 20 years from 13 countries who they thought would lead the world to a more sustainable future, and the most common reply (37%) was “young people” – only 10% thought that adults were capable of making

the necessary changes. Research by Merck⁽³⁾ showed that 90% of Portuguese young people are willing to alter their consumer habits to reduce their carbon footprint, well ahead of their European peers (8 percentage points lower). This survey of 6,119 young people in 10 countries aged between 10 and 35 also showed that if they were given the task of choosing which global challenge to address, 48% of generation Z would opt for environmental threats. Aware and concerned, a new generation of eco-entrepreneurs, known as Generation Restoration, has for some time been single-mindedly loyal to their cause, taking

A new generation of eco-entrepreneurs is eager to inspire the world to embrace the urgent task of regenerating nature.

real and effective action. To support their efforts, the World Economic Forum launched “Generation Restoration Youth Challenge”, a global appeal for solutions to save the planet. This initiative - headed by It.org (Trillion Trees Initiative) and aligned with the aims of the United Nations Decade on Ecosystem Restoration (2021-2030) - invited young people to send in ideas for conserving intact terrestrial and coastal ecosystems and restoring those which are degraded. More precisely, successful examples of eco-enterprise, as well as initiatives, programmes, campaigns and innovative projects that inspire the world for this urgent task of regeneration. Entries closed last year, and the “impactful and innovative” ideas will now receive support in order to publicise and implement them⁽⁴⁾. Proof that the future of nature lies in the hands of the young. Portugal is no exception. Here are three examples. ●

⁽¹⁾ <https://shre.ink/mQvc> ⁽²⁾ <https://shre.ink/mQRN>
⁽³⁾ <https://shre.ink/mQoe> ⁽⁴⁾ <https://shre.ink/mQsc>



Algae that clean fresh water

Particular microalgae can restore fresh water to a pristine state, fit to drink and ready to regenerate the ecosystem. It’s called “bioremediation” and has been used with success in the waters of the Lagoa da Ervedeira, near Leiria, offering a new solution for cleaning fresh water.

Mariana Silva, aged 18, and Matilde Tarenta, 17, got to know each other three years ago at the Eng^o Acácio Calazans Duarte Secondary School, in Marinha Grande. Last year they won second prize in the National Young Scientists Competition and represented Portugal at Regeneron, the world’s largest Science and Engineering Fair, in Atlanta, with their Pytoproject. This is a project that demonstrates the efficacy of a technique for removing nutrients by using a microalga - *Chlorella vulgaris* - in samples of polluted water. It all started in the midst of the pandemic, when their biology and geology teacher, Rui Fernandes, challenged them to come up with “a project that would change the world”, Mariana Silva tells us. They discussed several possibilities, but, Matilde Tarenta add, “when Mariana discovered the term ‘biorremediation’ in a documentary about the degradation of Lake Erie, in the United States, we knew what we had to do. Looking for a suitable aquatic environment, we chose the one we knew best - the Lagoa da Ervedeira, where I can remember swimming as a child”.

Mariana explains: “One of the biggest problems that freshwater faces is eutrophication, which is an excess of nutrients, resulting, for example, from discharge of agricultural residues, which causes algae to bloom, making it unfit for consumption and killing off native organisms”. However, she continues, “algae present a lot of mechanisms that can remove nutrients efficiently and sustainably”, and so Phytoproject “sets out to eliminate a high content of nutrients (mainly phosphorus and nitrogen - the main agents causing eutrophication), using a microalga, *Chlorella vulgaris*, immobilised in calcium alginate”. This makes it possible to restore the water characteristics and to regenerate the ecosystems in Lagoa da Ervedeira, “a body of water of great importance to the country”. They never imagined that their project would be put to the test, due to the pandemic, but with the help of lecturers and researchers at the universities of Coimbra and Aveiro, Phytoproject ended up going ahead. The in vitro trials were “a success”, showing “high percentages of removal”, Mariana Silva tells us proudly, confident that the project “opens up a new path to cleaning fresh water around the world”. ●

Gamifying recycling

Trash4Goods is a recycling platform on which users are rewarded. An educational way of recycling and contribution to reducing waste from a surfeit of disposable goods, including electronic waste.

Afonso Ravasco, Tiago Lourinho, João Trindade and Pedro Esteves were the mentors of the idea, which emerged two years ago, when they were students at the Higher Technical Institute (IST), and involved with JUNITEC, the institute's youth enterprise unit, which builds bridges between the student community and the business world. They noticed that "recycling rates in Portugal were very low", explains Afonso Ravasco, aged 25, co-founder of the company (of the four, only he and Tiago, aged 22 – both in the photo –, remain at the helm of Trash4Goods). They knew that many European countries had adopted a deposit system, assigning a value to waste that is thrown out. "This is normally a monetary reward, but we saw that we could be rather more creative and try to build a platform that would encourage users to recycle in an educational way, and would reward them", he continues. The first "proof of concept" for Trash4Goods, winner of the last year's e-Waste Open Innovation prize,

was at IST, where they built a "reverse vending machine" from scratch, to collect PET tins and bottles. At the same time, they collected Waste Electrical and Electronic Equipment (WEEE or e-waste) at other Lisbon faculties. At this moment, they are organising a pilot collection scheme at four Worten stores in the Lisbon region, focused on e-waste, with rewards for users who bring in the most electrical and electronic waste, giving away iPhone 13s and Worten gift cards.

Trash4Goods is applying for European and Portuguese, "for the start-up to grow", and they want to establish partnerships with producers of "reverse vending machines", which will boost their response capability. Afonso Ravasco believes that "by using things like gamification and raising young people's awareness of the need to reclaim resources, you build up the sense of responsibility in the community", and he's convinced that this type of action can unlock new solutions and business models. "The future depends on all of us", he concludes. ●



Regenerating land

A service for sharing land and livestock, designed to reduce production costs, prevent forest fires, retain carbon and make soils more resilient. It's called AniMob and it's just getting going in Mafra.

João Xavier, aged 26, was born in Lisbon, but he's always lived in the countryside. He studied for a degree in animal science and during the pandemic, as he went around the municipality of Mafra, he noticed that "land was being poorly managed, with livestock farming on small plots, without the space for soil rotation, which increases feeding costs". This started him thinking "whether it would be possible to set up a holistic management scheme, where the animals in the municipality could be used to manage biofuels on land, gaining access to new pastureland", he tells us. In essence, he explains, "regenerative land management, by moving animals about". AniMob grew out of precisely this idea of "opening up the possibility of animal mobility". On the one hand, João argues, "the owner of rural farmland or woodlands can choose not to clear it using machinery and opt instead for a more economic and long-term management service that regenerates the land". The idea won the Mafra Up ideas competition, and recently won second place in the Triggers Programme, organised by Casa do Impacto, but is

still at an early stage. "We've managed to buy some equipment to help move animals around in practice and we're working on pilot projects on various types of land, to work out the logistics and structure the costs", explains João Xavier. In addition, "in the last six months we've managed to create the website where landowners and producers can register, establishing partnerships, and we've developed the data base... and we've made the first match between a sheep farmer and an organic farmer". He has no lack of ideas, or enthusiasm. After investing in materials and infrastructure, and making a survey of local sheep, goat and poultry farmers, the aim is to "replicate the project in five municipalities". And lastly to develop an app where landowners can look up the network of livestock farmers. In short, says João Xavier, "regenerative land management using directed grazing is already happening – AniMob just wants to bring it online and make it easy, so that it's available to any landowner". He concludes: "Nature is able to regenerate on its own, we just have to let it get on the job, and not get in the way". ●

In the crisis, let's be 'creative'

A business report in the Brazilian press a few years ago was the first to note the easy leap from crisis to 'create'. Portugal's sister nation across the Atlantic is famous for seeing sunshine where others see only gloom, so it was natural that they should see that a simple stroke of the pen can completely change our outlook.

Recent months have set alarm bells ringing and conjured up apocalyptic scenarios, all for a good reason: we are facing the first European war of the twenty-first century (having fondly imagined that armed conflict was something that only happened in distant continents), inflation is rising to record levels all round the world and suddenly the fundamentals of our cherished economic credos no longer line up correctly, causing headaches for even our finest minds and most adventurous thinkers.

So, as the storm rages around us, what can we do? In 2020, at the peak of the Covid-19 pandemic, a number of leaders alerted us to the need to seize the opportunity to save our energy. When no land is in sight, sometimes the best thing is to float for a while, until the clouds clear and the sun returns, and we can concentrate on swimming in the right direction, instead of merely thrashing about. Those who succeeded

were greeted by a further shock in February 2022, when the invasion of Ukraine felt like the final straw for consumers and businesses alike, who felt they were just starting to emerge from the pandemic.

The words we have most feared for practically fourteen years rang out again: "there's a crisis coming". It can already be felt in tight family budgets, companies' energy bills and disruption to supply chains. But if a crisis is coming, what can we do? In a word, 'create'.

“May these months that await us be a seeding bed for new ideas, new strategies, new businesses - why not? - but above all a new economy.”

It's a well-established fact that around half the companies in the legendary Fortune 500 list emerged from periods of deep crisis. Procter&Gamble was founded after the Panic of 1837 which sent the US economy into severe depression for almost ten years. Revlon and HP were set up in 1932 and 1989, after the Great Depression in the US,

triggered by the New York indexes stock market crash of 1929. FedEx was founded after the oil crisis in 1973, and Costco in 1970, in the midst of the depression that marked that decade... More recently, we can point to LinkedIn, which started up in 2002 after the dotcom bubble, and to Airbnb and Uber, which emerged from the financial crisis in the wake of the Lehman Brothers collapse, in 2008. But does that mean we all have to start a company or a new venture to come out stronger from this new

period of uncertainty? No! But we can start by creating strategies that help new ventures to be more resilient to these moments of strain.

We need a slimmed-down, less leveraged organisations, able to withstand the first shock waves without getting buried in the sand - otherwise, when the real storm hits, they will lack the backbone to stand

tall. We need leaders better focused on creating thriving businesses, seizing the global opportunities of a country with so much potential to pull together and grow (figures from Mergermarket have showed that, up to November 2020, and compared with the same period the previous year, mergers and acquisitions grew by 26.1% in Portugal, already pointing to an important tendency in a critical year).

We need organisational structures which are nimble and less encumbered by hierarchies, so they can be quick on their feet and not miss out on business opportunities where time is of the essence. We need managers with a more global mindset so as not to let go of the talent emerging from our internationally respected universities, so that our highflyers stay in the country, instead of not giving a second thought to the possibility of working a country unable to offer opportunities for professional growth. We need people in government and our citizens to be more demanding and ambitious, not to look on business achievements and success as a capitalist tragedy, but as a way to a better life for everyone, especially those with the least opportunities. We need to promote diversity - of gender, religion, training and age -



in our board rooms, confident that more diverse management means stronger businesses. Interestingly, analysts at Goldman Sachs wrote in a report in 2020 that "in more or less any period since the global financial crisis [of 2008], having more women in senior positions or on company boards is associated with companies that outperform their rivals". They returned to the same idea this year in further reports. Let's be honest: no one expected that, some ten years on from a severe financial crisis such as that we experienced, that we would once

again be thrust into the strains of economic uncertainty and the fear that all may be lost. But there is no point in looking at what we failed to do in the last decade, unless it is for us to do much better in the decade ahead. For these months that await us to be a seeding bed for new ideas, new strategies, new businesses - why not? - but above all a new economy. Because, as the world keeps showing us, the old recipes no longer work. So, in this crisis, let's create new recipes. They might not work, but at least we will have hope to carry us through! ●

By Margarida Vaqueiro Lopes, journalist

The power of positive impact

Business is today recognised as having the power to steer us towards more sustainable development. The ESG - Environmental, Social and Governance - criteria provided the initial impetus for changing the way business is managed and funds are invested. The rationale is evolving into a broader concept of purpose and impact on society.

“Who cares, wins”. This was the title of a 2004 report from the United Nations Global Compact (UNGC), which coined the term ESG. Aimed at the financial market, “to better include environmental, social and governance issues in management analysis and securities trading”, the ESG model has had a snowball effect throughout the business world. Social and environmental responsibility is now inescapably tied up with the reputation, credibility and eligibility of companies on the markets. According to The ESG Opportunity in Europe dashboard published by PwC Luxembourg, ESG assets domiciled in Europe are set to reach a value of between € 7.4 billion and € 9 billion by 2025, accounting for between 46% and 56% of all the assets of European investment funds, as compared to 37% at year-end 2021. PwC also reports that 66% of European institutional investors plan to pull investments from non-ESG funds by the same year. The ESG rationale seeks to integrate metrics for environmental, social and governance criteria into the business indicators used for companies, in order to gauge the organisation’s commitment to those issues, but its impact has been felt more widely. This process has ushered in and consolidated a new approach to management, strongly committed to all stakeholders, be they members of the company’s value chain, local communities or civil society. This is what Klaus Schwab, chairman of the World Economic Forum, has called “stakeholder capitalism”, where the company seeks to contribute to development of society as a whole and not just to its financial results.

A new model

The social responsibility of companies is not a new concept and has been widely described and studied, both in economic theory, and in the social sciences, but it is currently understood in broader

and more exacting terms, due to public awareness of the need for new sustainable development models. The Paris Agreement and the Sustainable Development Goals, for instance, explicitly regard businesses as key actors, and are clear example of how institutions and other forces now see them as essential players in the pursuit of mankind’s aims. This is another reason why Daniel Traça, professor of economics and director of Nova SBE, believes it is important to look beyond the ESG criteria and investment dynamics, on a journey towards “a more fundamental answer to the question of how we should assess relations between business and society”. He accepts that the ESG standard is important in addressing current challenges, but underlines that this “is based on negative thinking, i.e. the risk to a company of not meeting the standards”. “Rather than measuring that risk we should look more at the positive impact of business on society”, argues Daniel Traça, stressing that “we should look at companies on the basis of their impact, from a positive perspective”. He advocates a model where companies are held to account by society and rewards to those with the greatest positive impact. The director of Nova SBE is clear in his view that “while ESG means that standards must be met in order to do things, the impact rationale requires businesses to align their whole strategy with the purpose of creating positive impact”. Daniel Traça gives examples: “A company that generates quality employment, that supports and upskills stakeholder groups, that actively helps to resolve climate change issues, through either its practices or its products, at the same time as creating value, is a company that generates positive impact”. He concludes his line of thought: “The greater this impact, the more the company should be regarded important to society”. ●



“We should look at companies on the basis of their impact, from a positive perspective.”

Daniel Traça
Director of Nova SBE

An agenda for a better world

How can we boost the positive impact of a company in a changing world? In the case of The Navigator Company, its 2030 Agenda is the backbone of that commitment.

In order to face the challenges and opportunities of the decade, The Navigator Company developed its 2030 Agenda. The result is a conceptual and operational template that is guiding the company’s strategy of responsible business management, with the aim of increasing its contribution to creating value and sustainable growth. The key concept in the 2030 Agenda is “Creating Value Responsibly”, expressing the aspiration to do business in a way that impacts positively on people and the planet. It is built around a central focus - “A Responsible Business” - and three strategic action areas: “For Nature”, “For Climate” and “For Society”. Discover the fifteen commitments that guide it.



A RESPONSIBLE BUSINESS

CREATING SUSTAINABLE VALUE

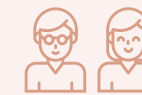
1. Develop sustainable bioproducts, reducing dependence on fossil resources and working towards a decarbonised economy.
2. Promote scientific and technological co-creation in the field of the bioeconomy and bioproducts.
3. Promote improved yields, resilience and sustainability in Portugal’s forests.
4. Develop innovative, competitive and sustainable products.



FOR NATURE

PRESERVE AND ADD VALUE TO NATURAL CAPITAL

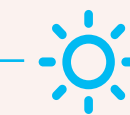
5. Promote efficient use of resources, minimising our ecological footprint.
6. Ensure sustainable use of soil and forestry resources, including biodiversity.
7. Promote circular bioeconomy, prioritising R&D solutions.



FOR SOCIETY

DEVELOP OUR PEOPLE, ENGAGE WITH COMMUNITIES AND SHARE VALUE WITH SOCIETY ON A FAIR AND INCLUSIVE BASIS

9. Promote development and upskilling of human capital in line with the Company’s present and future needs.
10. Contribute to the skills and employability of young people in the regions where we operate.
11. Promote an inclusive organisational culture able to integrate internal and external challenges.



FOR CLIMATE

CONTRIBUTE TO A CIRCULAR, LOW-CARBON ECONOMY

8. Invest in low carbon solutions leading to carbon neutrality.

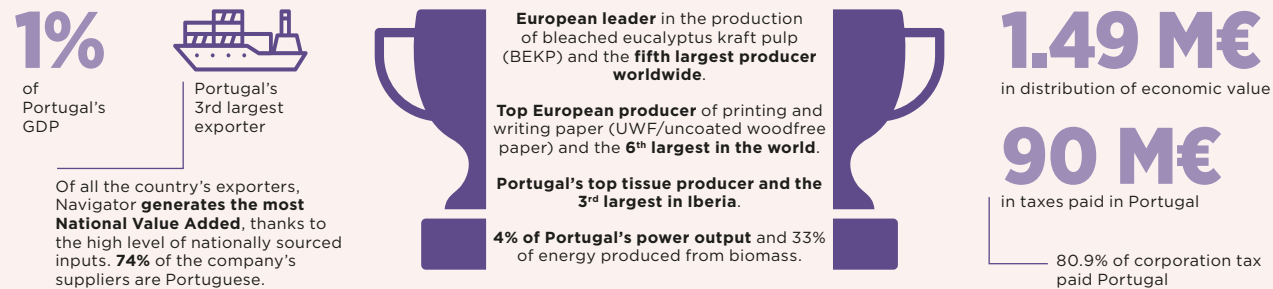
12. Provide a safe and healthy environment for Employees, ensuring their well-being.
13. Engage with national, international and local community institutional stakeholders, listening to their expectations and aligning them with Navigator’s strategy and needs.
14. Develop community relations.
15. Promote knowledge transfer and awareness of the economic, social and environmental importance of forests.

The Navigator Company Impact on society

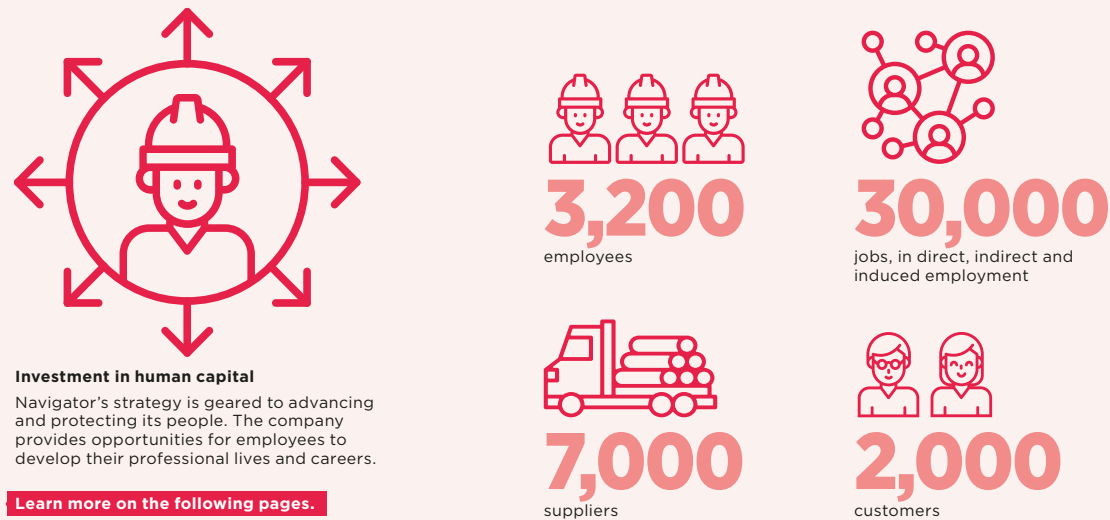
“We are inspired and moved by people, their quality of life and, above all, the future of our planet.”

The Navigator Company's Corporate Purpose

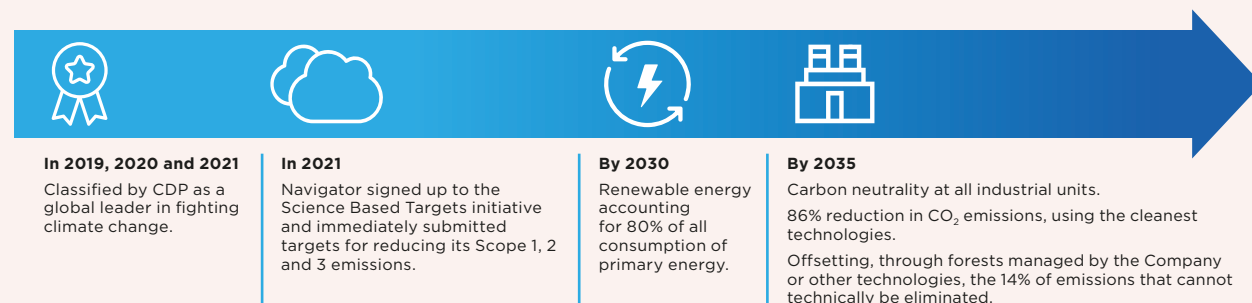
IMPACT ON THE ECONOMY AND WEALTH CREATION



PEOPLE



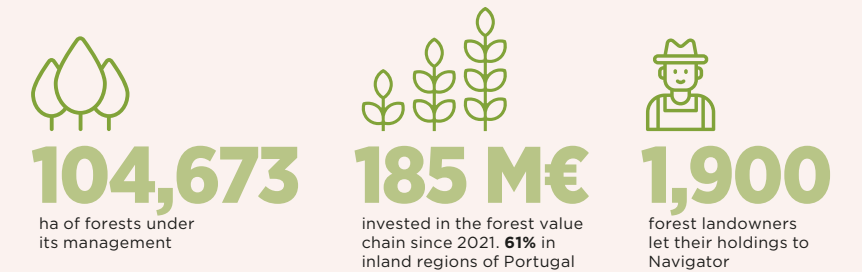
DECARBONISATION ROADMAP



THE COUNTRYSIDE AND SUSTAINABLE FOREST MANAGEMENT

Navigator is a driving force of the rural economy, helping to develop the regions where it operates. As a forest-based company, it has developed relationships with growers based on sharing knowledge and education about the values of sustainable forestry management.

Navigator's forest holdings are 100% certified under the FSC® and PEFC™ systems (since 2007 and 2009, respectively).



Biodiversity conservation

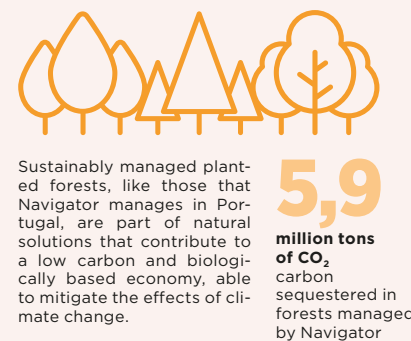
Navigator has a conservation strategy whereby it implements a series of management procedures, including buffer areas to protect valuable habitats, and it delays forestry work and maintenance operations when the work coincides with the nesting season of particular birds.



Species identified and monitored in Navigator's forests



FROM FOREST TO BIOPRODUCTS: POSITIVE IMPACT ON THE PLANET'S FUTURE



A new generation of bioproducts

Navigator is involved in promising R&D projects to generate a broader range of renewable, recyclable, and biodegradable bioproducts, made from cellulose, able to substitute fossil-based products.



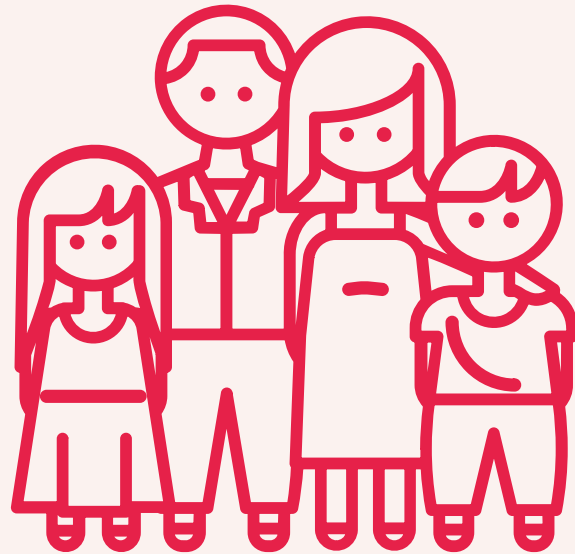
“From Fossil to Forest” Agenda - Developing sustainable packaging products to substitute fossil plastic



Eucalyptus globulus is effective at retaining CO₂: Each year, per hectare, this species sequesters around 11.3 tons of CO₂, **the highest annual sequestration figures for any species found in Portugal's forests** - more than **seven times** higher than for cork oaks and **three times** higher than maritime pine.

People at the centre of everything

Investment in people, their skills and professional development is an integral part of Navigator's Purpose and strategy. The company offers a wide range of benefits for its employees and their families, in order to contribute to their personal and professional development, health and quality of life. These benefits apply to Group companies in Portugal.



In July last year, Navigator and the organisations representing workers successfully concluded a labour agreement with a duration of 2 years (2022 and 2023), something never before achieved. Especially important at this time of great economic and social uncertainty, this agreement will permit the company to continue investing in its current operations and in diversifying its business, as well as continuing to increase the spending power of its employees.

HEALTH AND WELL-BEING



OCCUPATIONAL HEALTH PROGRAMME

The Occupational Health Programme seeks to contribute to the physical, mental, and social well-being of the company's people. The aim is to provide comfort and safety for employees, and there is a special focus on preventing health issues or injuries resulting from work.

The programme divides into four action areas

Healthy Eating



Physiotherapy



Psychology



Welfare



As well as working in prevention, the professionals in each of these areas help people to adopt habits and techniques that enable them to overcome difficulties originating in their working or personal lives.



INSURANCE FOR EMPLOYEES AND THEIR FAMILIES

Health insurance

The health insurance covers employees and their families. Expenses can be claimed for treatment outside the network, with separate ceilings for each family member. Employees can also contract extended cover, through pre-defined top-up plans.

Life insurance

All Navigator employees with a permanent employment contract are covered by life insurance, with pay-outs for death or invalidity (total and permanent).



HEALTHCARE ACCES

Employees can consult the company doctors or use the nursing service. All industrial complexes have a duly equipped medical unit.

EASING THE TRANSITION TO A NEW STAGE

Pension fund

In order to complement social security retirement pensions and help maintain their living standards when they reach retirement, employees benefit from the Navigator Pension Fund. Navigator pays a monthly contribution calculated as a percentage of each employee's salary. Employees become entitled to pension benefits, in most cases, after three years' length of service.



SUPPORT FOR FAMILIES

Educational expenses for children represent a major burden on family budgets. Aware of this, Navigator invests in young people's future through a series of schemes.



CHILDCARE ALLOWANCE
Contribution to day care for employee's children.



EDUCATIONAL ALLOWANCE
Support for educational expenses of employees' children aged 6 to 25 attending primary, secondary or higher education.



STUDENT BURSARIES
We provide study bursaries for our employees' children in higher education, studying for a first degree, Master's degree or PhD.



SUPPORT FOR CHILDREN WITH SPECIAL NEEDS
We pay a special allowance for employees' children with special needs.



FAMILY CHRISTMAS
Every year we offer Christmas presents to our employees' children (up to 12 years of age).

FLEXIBILITY



HYBRID WORKING
Navigator currently operates a hybrid working model that enables employees whose jobs enable them to work remotely to work from home up to 2 days a week.



SHORTER WORKING HOURS
Aware of the importance of a better work-life balance, the company has instituted a 38-hour working week, instead of the normal forty hours.



25 DAYS' HOLIDAY LEAVE
Employees are entitled to 25 days' holiday leave each year, three days more than stipulated by law. They are also given Christmas Eve and Shrove Tuesday. Shift workers who continue to work on this basis are entitled to one extra day after 25 years, and two extra days after 30 years.

PERSONAL AND PROFESSIONAL DEVELOPMENT



LEARNING CENTRE

A digital platform design to respond to the training needs in the different business sectors and enabling employees to improve their skills and grow as professionals. This internal portal is also available on mobile devices, and provides Employees with online learning, allowing them to consult the training of offer and to view training course schedules.

TRAINING

More than 500 training events each year, in areas such as leadership, management, behavioural, technical training in pulp production, tissue paper, energy, forestry, safety, laboratories, environment, management systems and information systems. More than 600 e-learning courses available on the Learning Center portal, to which any employee can sign up.
* Specific Navigator e-learning courses, in the fields of safety, management systems, environment, laboratories, and others.
* Complementary e-learning in the fields of pulp manufacture, paper, energy, tissue, maintenance and safety.

ONLINE LANGUAGE LEARNING

Available on the Learning Center portal, for all employees and their immediate families (spouses and children). Twelve different languages offered, including conversation lessons with native tutors.

CONTRIBUTION TO ACADEMIC COSTS

In order to support and encourage employees in developing their expertise, Navigator contributes to the costs of academic studies, including: PhD, MBA, Master's degree, first degree, post-graduate studies and advanced courses lasting 3 months or more.

REDUCED FEES AT ISCTE

A 10% discount on total fees for employees, spouses and children, on post-graduate studies, Executive Master and Executive MBA, at ISCTE Executive Education.



In 2022, The Navigator Company opened its doors to 110 young talents. The Talent Attraction Programme is a unique opportunity for younger generations to acquire valuable experience at the same time as learning new skills and preparing for their professional future.

MOBILITY



Travel
Free transport service to and from the Figueira da Foz and Setúbal sites.



Fuel
Discount cards for several major filling station chains.



Personal travel
Discounts in air travel, hotels, car hire and service charges.

The Gomes da Costa family tradition

For seventy years, Companhia Portuguesa de Celulose, today The Navigator Company, has trained or provided education for 28 members of the Gomes da Costa family. This is a story of how a company changed the lives of several generations. And of a whole region.

With the death of José Maria, in February this year, and the retirement of António, in May, the Gomes da Costa family history with The Navigator Company has come to a close. Carlos Gomes da Costa, José Maria's son, looks back and tells us how the Company has been like a second family to him and his family over nearly seventy years.

It all started in 1953, when José Maria Gomes da Costa, then aged 25, went to work at Companhia Portuguesa de Celulose – The Navigator Company's predecessor – in Cacia, in the district of Aveiro. This proved to be “an important turning point in the lives of people from very poor backgrounds”, recounts Carlos, now aged 66, the youngest of José Maria Gomes da Costa's four children. “My father was orphaned very young, and as he was the eldest, he had to work to support his siblings”, he tells us. As well as being a shoemaker – he had a small workshop where he made hunting boots –, he'd had nursing training in the army, allowing him to “administer injections in the surrounding villages”. Even so, when he married, in 1952, money was tight, and so a job at the mill, which he combined with his boot making, ended up being “an opportunity to bring home some more money”. Originally hired for the energy production sector, he later moved to water treatment, where he stayed until he retired, at the age of sixty-five. The arrival of José Maria Gomes da Costa at the mill marked the start of

an unprecedented saga: over nearly seventy years, 28 members of the Gomes da Costa worked in all the different sectors of the company. The first to join José Maria at the company was his brother, José Gomes da Costa, then aged 23, also a shoemaker by trade. They were later followed by cousins, their sister, brothers-in-law, children, nephews...

Opportunity for growth

At that time, it wasn't easy to hire personnel. “There was little manpower in the region, which was mainly agricultural – the village people were practically all working on the land”, recounts Carlos Gomes da Costa, recalling that the company had been forced to recruit workers from outside the region, in particular from Mogadouro and Freixo de Espada à Cinta. Recruit and train. “As from a certain point, the company started efforts to train and educate its workforce”, he says, recognising that work at the cellulose mill served to bring “better incomes and education for a lot of people in this area”.

“The company paid for the books, gave us two hours a day to study, provided transport after work...”

Carlos Gomes da Costa

José Maria Gomes da Costa (right), water treatment operator, in 1960.



Carlos Gomes da Costa gives his own example: he joined what is now Navigator at the age of fifteen, as an assistant electrician, and left at the age of fifty as head of the Industrial Projects Department. “Working here enabled me and others in my family to access training which was otherwise out of reach, with the result that my father's grandchildren and great grandchildren are now senior employees in different companies, specialising in areas across the Portuguese economy”, he explains. He points out that both when he and his two brothers completed their industrial education, equivalent to the



The Cacia basketball team, in which Carlos Gomes da Costa played.

Carlos Gomes da Costa, in the nineteen seventies, as a maintenance technician.



Carlos Gomes da Costa (the tallest), now as a young engineer at the company.

9th grade today, they had to go out and work. But that didn't mean the end of their studies. On the contrary. Carlos Gomes da Costa carried on and eventually graduated in Electronics and Telecommunications from the University of Aveiro. Something he says would not have been possible without Companhia Portuguesa de Celulose. “The company paid for the books, gave us two hours a day to study, and provided transport after work...”, he recalls. “If it weren't for the company, I wouldn't be what I am today”. “As the company needed skilled manpower, it invested in training its employees”, explains Carlos Gomes da Costa. To the point of building a primary school on site, to combat the “high level of illiteracy in the region”, he tells us. Philanthropic, but still expecting high standards: “People who failed the year through non-attendance or failed to make the grade two years running, were excluded from attending!”. “An exercise in civic and social responsibility” that wins praise from Carlos Gomes da Costa. All this brought professional qualifications for a lot of people and did a lot for the region as a whole. “This was an essentially agricultural area, with poverty and low incomes, and today it's a rich and powerful industrial area”, he points out, recalling that the arrival of the mill, “which paid exceptionally good wages”, obliged other factories setting up in the area to set higher wages. All this contributed to “changes in the region's landscape”. “From being a farming community, the Lower Vouga area has become urban in character”. This “friendly policy” vis-à-vis local people and the community is imprinted on Carlos Gomes da Costa's memory. Not least because, in view of the long tradition of family members working at Navigator, “it's as if the company were part of my family”. ●

Learning with the vagaries of nature

Working with the land and its produce means coping with the vagaries of nature. Two agro-forestry engineers and a beekeeper talk about the constant uncertainty, but also the technical skills and expertise that can mitigate the consequences of the unpredictable.

“I enjoy the constant challenge and the new ideas I hear from my son, who’s studying agricultural engineering.

They encourage me to try new things to anticipate difficulties and overcome them”, says Miguel Vasconcelos Guisado, manager of the Quinta da Póvoa and Quinta de Vale Corvo, family-own agro-forestry estates in the Torres Vedras area, where there have been eucalyptus plantations for eighty years and the uncertainties of forestry production have been faced by investing in sustainability.

“In this business we’re always hoping for a good year and sometimes we get a very tricky one”, he admits, saying that the greatest unknowns are climate change, with worsening fires and drought, the market and public policies. In 1995, the fire that destroyed part of their output led to a decision that proved to be fundamental: “We decided to reduce the factors of risk and uncertainty, and so to increase profitability.” How? Adapting to the vagaries of nature entailed using vineyard and orchard techniques in a non-traditional eucalyptus plantation, in lines, but with less use of machinery, and then maintaining plantations without soil mobilisation. This combats erosion, improves the pH, humidity and

organic matter in the soil, as well as reducing maintenance costs, “which now, with the war, has actually helped reduce the impact of unpredictable rises in fuel prices on operations”, he saw with the pride of someone ready to face any surprise the future may hold.

They never again had a significant fire, but they continue to guard against all eventualities. Scrub is controlled within the eucalyptus plantations by using cattle and chippers, they maintain paths and encourage diversified woodlands as a buffer area, to encourage helpful fauna and biological predators, which prevent diseases and pests. They also use improved eucalyptus plants, adapted to conditions in the region, making for better yields and greater resilience. There are wells, a borehole and two ponds which have been used in the

“In this business we’re always hoping for a good year and sometimes we get a very tricky one.”

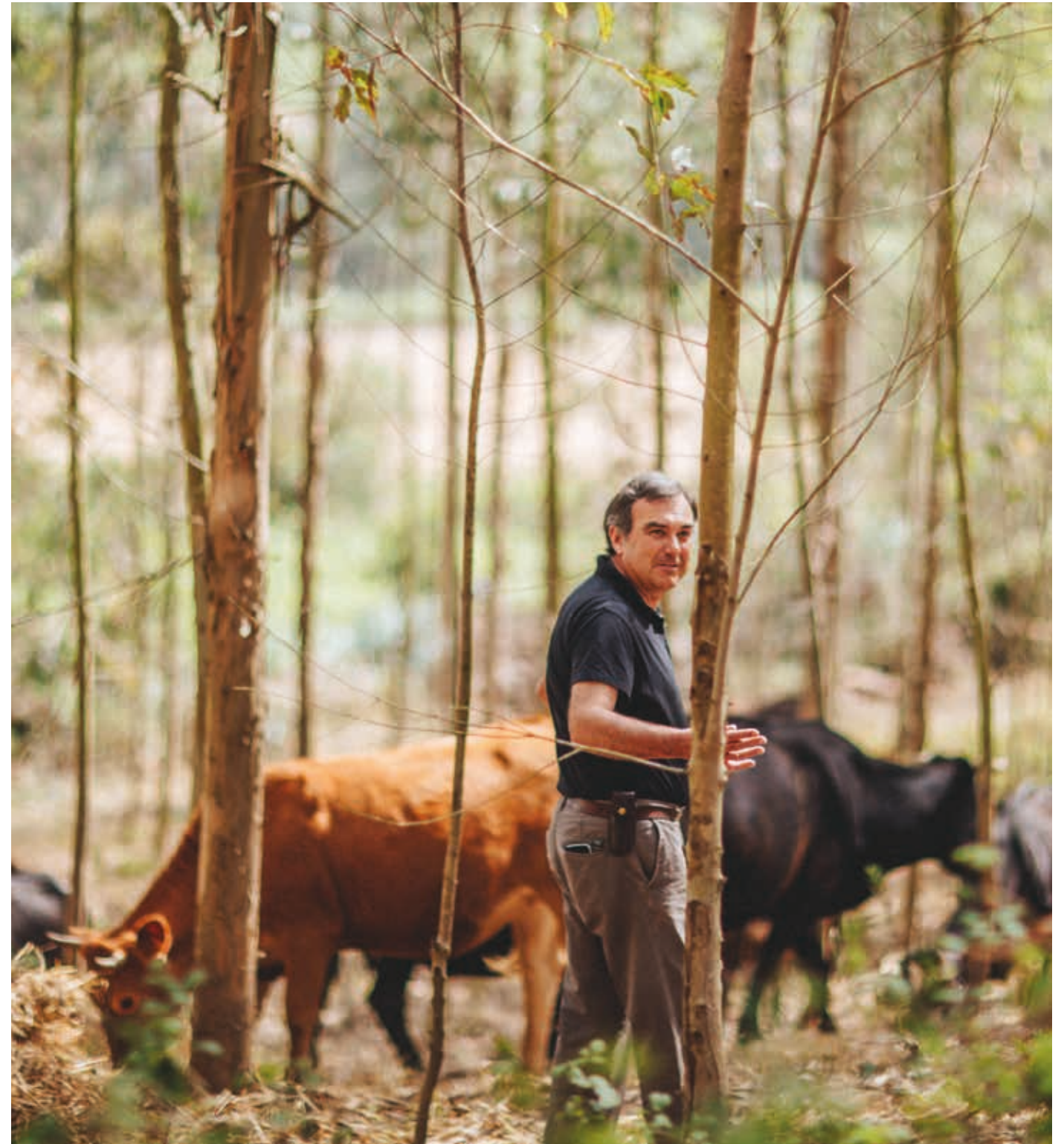
Miguel Vasconcelos Guisado

past to supply fire engines, as well as a fire kit with a 2000 litre tank to assist frontline intervention by fire fighters. Even so, uncertainty about environmental policies is a concern, both as regards the drought and the future of production. “We need to retain water when it rains, but legally it’s very tricky for a producer to build a small dam. On the other hand, the expectation is that demand for eucalyptus fibre will be every greater, because it can be used in a number of green products as well as paper, but it’s not certain in the medium and long term, with serious government restrictions on production and urban myth making against eucalyptus”, he bemoans.

“Adapting is part of human nature”

“Over the ages, uncertainties have always been part of our daily lives”. Carlota Lisboa is manager of Sociedade Agrícola Cordeiro Lisboa. In her experience, she tells us, “adapting is part of human nature and people’s ability to cope with the uncertainties is what makes the difference”.

In charge of the Vale Grande e Falcão Estate, in Ponte de Sor, she tells us there are no absolute certainties, or uncertainties. Instead, in farming, there are “constant changes”. In the climate,



Miguel Vasconcelos Guisado, agro-forestry producer.

“Adapting is part of human nature and people’s ability to cope with the uncertainties is what makes the difference.”

Carlota Lisboa

technology (constantly evolving at speed), policies, tax rules (with no long-term vision and daily changes) and in society (lack of manpower), and they all cause things to evolve, for better or worse. “The greatest difficulties have to do with the lack of overall planning, in the short, medium and long term, in all these areas”, she tells us.

The need to feed the world’s population, without waste, requires practices very different from those used today, but also very different from those our ancestors used, in the view of Carlota Lisboa. “Local production and consumption, which was previous the rule in farming, is no longer profitable, but it was good for the environment and biodiversity.”

She explains that constant changes have been forced on the sector over the past sixty years. “In our family business, all the stages, from building dams to installing irrigation systems - for better management of an increasingly scarce resource -, as well as buying machinery to prepare the land the apply phytosanitary products, all these have been priorities, in order to achieve sustainability and maintain biodiversity in farmland and woodland”, she tells us. In addition to producing pine, cork oak and eucalyptus, which has been grown for six decades, down the years she has planted specific varieties of maize, peppers and broccoli for the frozen foods and canning industry, and strawberries for local and regional consumption. She has now set up a semi-intensive olive plantation and an olive oil production unit, for her own use and that of small local producers, “in attempt to halt the phenomenon of rural flight”.

“When things are uncertain, diversify”

“When I didn’t have a wife and children,

I didn’t think of this, but now I ask: ‘Will I be able to produce enough next year to meet my responsibilities?’”, admits the beekeeper Paulo Ribeiro. Although he sees his beekeeping not as work, but something he really likes doing, “the fact is that stability in this life is complicated”.

With more than two hundred hives in the municipality of Nisa, he’s been able to keep bees on a full-time basis since 2010, with annual output of around 4 tons of honey. However, the unpredictability of the climate, which he says gets worse from year to year, could lead him in future to take up some other employment outside agriculture.

For the moment, climate change is really the main area of uncertainty. “The seasons are less defined, causing flowers to bloom early, when the hive is only half developed. Or sometimes the cold last longer, leaving plants dormant when they should be producing nectar. Or higher than usual temperature, causing water for the plants, and no nectar, in the honey-making season”, he explains. “They get used to the seasons being unpredictable, but for us things get trickier”, says Paulo Ribeiro.

He has responded to uncertainty by adding value to his product, so he has invested in organic production. But that also means he is more limited in how he reacts to seasonal difficulties. He can only feed the hives with hone and pollen from the area and “steal” breeding stock from stronger colonies to boost weaker ones. “As you never know what you’re going to produce at the end of the year, you increasingly have to diversify”, he concludes, explaining that, as well as honey, he can also sell swarms, pollen and propolis or bee glue, a plant resin that bees collect and which is a natural antibacterial substance. ●



Carlota Lisboa, agro-forestry producer.



Paulo Ribeiro, beekeeper.

The psychological impact of newfound insecurity

Teresa Raquel Pereira is studying for a doctorate in Psychology and Climate Change at the University of the Minho, with research into the concept of eco-anxiety. She tells us that this is an increasingly important issue faced by people working in the primary sector, exposed to natural factors.

“Farmers are especially susceptible to developing symptoms of this type. The natural causes of instability, which have always existed, have now been joined by anthropogenic causes, which make extreme and unexpected climate phenomena much more frequent. These professionals are among the first and worst affected by the impacts of climate change. The fact that they’ve always dealt with uncertainty doesn’t make them ‘immune’”, she points out.

The same can be said of people working in fisheries, beekeeping, forestry and many other sectors. “The more the risks are able to affect their livelihood and living standards, or their relationship with the future, the greater the impact of the anxiety”, she explained, saying that in order to curb this anxiety it is essential “to have a well-informed community and support for people to express their emotions. When people can’t find this in their family or close circle, it can be found in professional associations, or even in groups of activists”.

No less crucial is the need to learn more about the factors that can reduce the risks of unpredictability. Teresa Raquel Pereira has no doubt that “the best antidote is action. Farmers create associations, scientists write manifestos, both are ways of getting involved, often combined with lifestyle changes.” ●

Shared knowledge

The Navigator Company is deeply involved in sharing knowledge with forestry producers in Portugal. Best practices in forestry management, along with technical expertise and improved plants, are some of the fundamental elements in a working relationship that seeks to mitigate factors of uncertainty and improve the quality of life enjoyed by people dependent on the land.



Susana Morais
Forestry Extension
Coordinator at
Navigator

Working with certification bodies and forestry associations, to which she is keen to pass on the technical expertise needed for better eucalyptus production, Susana Morais is a forestry engineer and a forestry extension coordinator for Navigator Forest Portugal. She has been rolling out the Premium Programme, aimed at working directly with forestry producers in the field.

“What we offer, free of charge and with no strings, is access to expertise for anyone coming forward with questions, and also training for technical staff for non-Navigator entities, so they can also work to promote improvements in forest management”, she explains.

The work is almost exclusively carried out in the field, and almost always on the producers’ holdings. Able to draw on expert knowledge from RAIZ, Navigator’s forestry and paper research institute, which develops innovative products and cutting-edge techniques for eucalyptus cultivation, the programme works closely with people in the countryside, ensuring information reaches the right people. This is crucial for improving plantations and reducing fears about the future, especially among small producers.

Encouraging best practices

“Navigator has a huge store of expertise and we want to share it”, explains Susana Morais. “You need to really know your soil, choose the best plants, plant them at the right season, use the right fertiliser, and it’s essential to combine these and other factors to get the best results. Everything is important: preparing the land, choosing the plant, nutrition, applying products and controlling invasive species, selecting saplings, and safety at work. It’s enough for one operation to be done at the wrong time to compromise the success of the plantation”, she tells us. The Premium Programme has been set up to analyse the specific circumstances of each plot and plan the future eucalyptus plantation,

The risks of nature and human nature

“Forestry producers have always been subject to the risks of a fickle climate, as seen in frosts and fires, for example, and in pests and diseases, but the level of uncertainty we have reached requires precautions of a different degree, such as more active silviculture”, explains José Luís Carvalho, in charge of The Navigator Company’s Forestry Innovation and Extension team.

As a forestry engineer, he points to another important risk for forestry producers, which also has to do with nature, but more precisely with human nature. “The legal and administrative framework, much of it implemented without warning or ill-adjusted to reality, sometimes has more significant effects than climate change”, he says, citing recent examples of changes to Portuguese law on forests, employment in forestry and logging, “with an impact on forestry occupations, driving out some of their best advocates”.

Whilst, in terms of regulation, unpredictability can only be mitigated through coordination between companies and institutions, so that a positive influence can be brought to bear on government and local authority decisions, risks originating in nature can be minimised with expertise and good practices. “Reforestation has to be planned thinking of the risks, and projects have to take them into account, from soil preparation, with conservation practices which enable water and organic matter to be retained, to selection of plants, in the light of phytosanitary issues, with a fast response in corrective measures, made possible by digital monitoring”, counsels José Luís Carvalho. ●

Set up in 2018 in partnership with RAIZ, the Navigator research institute, the Premium Programme sets out to respond to the questions and issues raised by forestry landowners. It provides personalised technical support free of charge and is aimed at eucalyptus plantations.



+ 350
instances of
direct support
for landowners,
over more than
6,000 hectares
of private land
(Premium
Programme)

+ 100
sessions and
1,000 trainees
(Tech4Forest)

13.600
users
(E-globulus
Platform)

helping forestry producers free of charge to take properly informed decisions. “It didn’t make sense for us to invest in genetic improvement to achieve plants better adapted to current climate conditions, and more resistant to pests, and then not to share this progress with other producers”, concludes Susana Morais. Navigator also has other tools available for forestry producers, such as through the online E-globulus platform where they can consult forestry management models for each holding. Or Tech4Forest, which provides training for technical staff from forestry producers’ organisations, certification groups, company operatives in the field and landowners on topics such as health and safety at work, good production practices and legislation. Digitisation is also gaining ground and new processes are being developed and piloted with producers’ associations. José Luís Carvalho, in charge of the Forestry Innovation and Extension team at The Navigator Company, tells us that they expect “great progress and efficiency gains, for example, in monitoring pests, using drones and satellite imagery, currently available every fortnight”.

Another area of innovation has been the development of new tools with built-in technology, making it possible to aggregate operations and record the geolocation of planting lines and plants, presenting an opportunity for optimising future mechanised operations, possibly even using robots.

Alongside these efforts to pass on skills to private producers, Navigator has invested heavily in encouraging forestry certification, and in 2021 increased the percentage of certified Portuguese wood it purchased to 63% (it was just 12% seven years ago). With the experience that comes from managing, in Portugal alone, 104,673 hectares of forest, all of it certified, The Navigator Company’s knowledge sharing brings real benefits in the field. According to Susana Morais, a forestry producer who meet the requirements of economic, social and environmental sustainability set by certification, “there will assuredly be better manage practices, with a positive impact on the community, adding value to output and preserving environmental and social assets”. ●

Uncertainty and science

Something is certain when it raises no questions, when we can call it true or real. Uncertain things are those that raise doubts. Most people associate science with certainty. When people say that science considers this or that to be certain, they mean that this or that has been well established. In reality, rather than arriving at certainties, what science does is reduce the uncertainties. Thanks to the scientific methods, we today know certain things (such as “the Earth goes around the Sun” or “life on Earth has a common genetic code”), but there are others we don’t know (for instance, “how did life on Earth start?” or “is there life on other planets?”). The history of science shows that, when we answer one question, several others then present themselves. Human knowledge of the world appears not to reach an end point.

Human beings aspire to having certainties. But the American astro-physicist Carl Sagan warned in *The Demon-Haunted World*: “Human beings can long for absolute truths and aspire to them; they may claim, like the followers of certain religions, to have arrived at them. However, the history of science - by far the most successful claim to knowledge accessible to man - teaches us that the most we can expect are successive improvements to our understanding, learning from our mistakes, an asymptotic approach to the universe, but with the limitation of knowing that absolute certainty will always elude us.”

Scientific discussion serves to reduce uncertainty. It’s where the light comes from: sooner or later there will be better answers than those that came before from applying the scientific method, which is based on observation, experimentation and mathematical reasoning. The public often expects scientists to arrive quickly at certainties (as shown by the issues of Covid-19 and global warming), but science can only improve our knowledge. There will always be room to learn more. Because some knowledge is more certain than other knowledge, scientists should refrain from expressing absolute certainty. The laws of Nature are general descriptions of how the world functions, but they can be changed if the world turns out to be different from what we supposed. Of course, we will never change everything we know - science has built firm foundations -, but we may have to change a little of what we thought we knew in order to accommodate a new discovery.

What distinguishes the certain from the uncertain, is its correspondence to reality. We speak of proof when we find that it corresponds. By means of proof, consensus is formed in the scientific community, and then transmitted to everyone (for example: “Covid-19 is due to a new virus” or “global heating is caused by man-made CO₂ emissions”).

Proof has to be sufficiently strong for it to be accepted. But additional elements may come to light, leading us to review a given conclusion. Science must always be faithful to reality, which is the “Supreme Judge”.

In addition to its general meaning, the word “uncertainty” is used with specific meanings in some areas of science, such as mathematics, physics, chemistry, biology, psychology etc. In physics and chemistry, so-called exact sciences, the term uncertainty is associated with the degree of precision of measurements. When a measurement is made of a physical or chemical magnitude, there is always uncertainty: there are occasional, unavoidable errors, and others which are systematic and avoidable, or at least, minimizable. A series of measurements must therefore be made, instead of just one. In processing data, we use statistics, a discipline

“Because some knowledge is more certain than other knowledge, scientists should refrain from expressing absolute certainty.”

related to the concept of probability. This emerged in the seventeenth century to describe games of chance, where there are unpredictable situations due, for example, to the throw of the dice.

When, in the nineteenth century, science set out to describe complex situations, such as gases (formed by many particles in incessant movement), it quickly realised that it would have to use probability and statistics. The assertions it makes in this field are uncertain, and probability is a way of describing uncertainty. We know today that in astronomy, there can also be great uncertainty, due to the phenomenon of “chaos”: small differences in initial states can lead to very different end states.

In quantum physics, which emerged in the twentieth century to describe microscopic reality, uncertainty is incorporated in a more fundamental way. The “principle of uncertainty” was found to be valid here, telling us we cannot know simultaneously the precise position and velocity of a particle. They can only be described with the use of probability. Einstein reacted with his famous phrase: “God does not play dice”, in other words, reality for him could not be a matter of probability. However, quantum theory works: it explains chemical bonding, and so underpins the natural sciences.

In short, uncertainty is a constant in science, including the exact sciences. ●

by Carlos Fiolhais, physicist



A special edition

Creating the 120 pages of this special edition involved us travelling the length and breadth of the country to interview and photograph dozens of people who shared their stories, knowledge and opinions with us. Faced with the cameras, some welcomed us shyly, others were entirely relaxed, but all showed infinite patience.

36
Interviews conducted



45K
words written



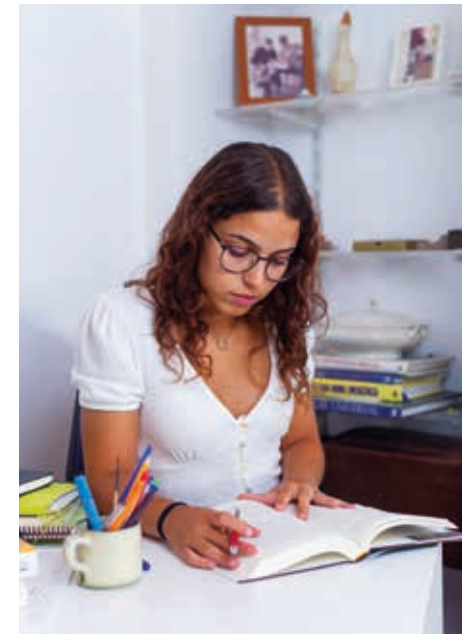


21

photographic sessions...



...2,156
photographs



242
telephone calls

26
meetings

**And a lot of
positive vibes**



More than 30
people involved in writing, editing and printing

Navigator joins scheme to invest in forestry training

The Navigator Company, Altri, Corticeira Amorim and Sonae Arauco have set up a public-private partnership to encourage higher education studies in forestry. The companies will finance 22 study bursaries covering 100% of the fees for courses in forestry engineering at the University of

Trás-os-Montes and the Upper Douro, the University of Porto, the Higher Institute of Agronomy and the Higher Institute of Agronomy in Coimbra. The aim is to help increase the availability of qualified professionals in this area, in response to growing demand from the market.

Reducing water use at The Navigator Company mills

Water is a precious and finite resource, a priority topic on The Navigator Company's agenda. The company is implementing a Water Use Reduction Programme (WURP), with the aim of responding to the constant challenges in this area. In its first few years, the programme focused on making a survey of water supply, distribution and utilisation networks, and on measuring flowrates, making it possible to identify and characterise water uses by sector, machinery and applications. The knowledge acquired at this stage enabled each working party to identify more than forty specific reduction measures in each mill. These measures were prioritised on a reduction-per-cost basis, and so far 23 measures have been implemented at Navigator's industrial complexes. All the measures identified will be implemented by 2027, by when water use will have been reduced by 29% in relation to 2021 levels at the Aveiro complex, by 25% in Figueira da Foz and 24% in Setúbal.



Pavão de Espirra Rosé innovates in presentation



Pavão de Espirra Rosé 2011, a wine produced on the Espirra Estate, in Pegões, owned by The Navigator Company, is now available. This year, the wine has innovated in its presentation: as well as the traditional bottle, there is a three litre Bag-in-Tube option, with a label in Navigator paper. Created from grapes harvested from long-established Castelão vindes, Pavão de Espirra Rosé has a balanced and youthful flavour, excellent freshness, good acidity and a fruity after-taste. **Find out more about Espirra wines at www.espirra-wine.com**



Sandra Santos
Member of the
Board of Directors of
The Navigator Company

The certainty of uncertainty

From early childhood, we are taught to think negatively of uncertainty, inevitably connecting it to sense of loss of control in the face of the unknown. This prompts us to seek out routines that make the future apparently more predictable, in an approach to the world shaped by this need for comforting certainty.

But comfort does little to stimulate creation and innovation.

If even the exact sciences reject determinism, why should we not regard uncertainty as a key factor in making progress in our lives?

Accepting that nothing is more certain than uncertainty about the future encourages us to build and to debate scenarios and ideas; it leads us to prepare different responses for each of the possibilities. It whets our curiosity, that search engine for solutions to new problems.

The certainty of uncertainty is the greatest stimulus for the development of people, science, ideas, and also organisations and companies. In this process of development, it is up to leaders to stimulate the curiosity of the led and, along the way, to be just as accepting of failures as of successes.

We often hear debates about the precise dividing line between innovation and improvement. But businesses that innovate not only improve what already exists, but also create something new during the improvement process. They are bold and fearless, unconstrained by the need for certain success. They accept risks, even knowing that things can go wrong.

It falls to leaders to create teams with different skills, able to manage operations in situations of great volatility. But it is also their job to dream and make others dream, leading the group to aspire to greater achievements, a richer legacy. The last two and a half years have seen a great deal of innovation and disruption, prompted by highly uncertain, and sometimes emergency, situations. And they have also proven the power of mobilisation around a common purpose, which makes a team greater than the sum of its parts.

Not only were vaccines and treatments invented for Covid-19. The limits of possibility were challenged and ways found to develop them in record time. Civil and scientific societies reinvented themselves in the face of huge uncertainty and did so for the sake of something better. On behalf of all of us.

Europe's energy dependency has been a certain fact for a long time. But that certainty failed to create any sense of urgency about changing this.

And so, it also generated no disruption. Only now, faced with uncertain access to sufficient energy, has Europe and its organisation taken action, urgently reinventing themselves. The certainty of uncertainty is once again the driving force of disruptive change.

Leaders also reinvent themselves and adjust. Management in volatile and uncertain circumstances requires specific skills, starting with the ability to interpret and accept more risks. The problems are more complex and interconnected and demand more sophisticated tools. The decision-making process has to be quick, flexible and strongly anchored in data intelligence.

At periods of great uncertainty and volatility, the companies that get ahead have strong but flexible organisational models, that adjust to the needs of the moment. That develop simple and fast decision-making processes. There is no room for red tape and layer upon layer of hierarchies. The heightened need for an interdisciplinary approach in making decisions make collaboration and co-creation even more important.

Over the past two years, businesses have had the opportunity to execute contingency plans never before put to the test. New pathways to growth have been identified and many strategies reviewed. We have strengthened organisational values, practising them more than ever. The focus is on developing people and the organisation to act in more complex settings.

When we approach uncertainty, the first thing perhaps is to challenge the concept.

And deconstruct our preconceptions. ●



Adriano Silveira
Member of the
Executive Board of
The Navigator Company

The certainty that we have a role to play

Uncertainty is inevitable, but not necessarily fatal. Historically, it has prompted mankind to question and reconsider, and then to progress further. All research starts from a kind of restlessness. History is full of examples of how human ingenuity flourishes in the face of adversity. So, uncertainty is what we succeed in making out of it.

I am not seeking to downplay the difficulties before us, but instead to point out that uncertainty is a more constant phenomenon than the illusory stability of our lives. The “certainties” are the intervals in history. And they do not always turn out well.

This reflection is all the more necessary when we live, like today, in times of far-reaching change. In the first place because of the challenges laid down by technological innovation, climate change and the urgent need to find new, more sustainable development models.

At The Navigator Company, times of change have been viewed with a clear awareness that businesses are an absolutely crucial player in designing responsible solutions to the ethical, social and environmental challenges the world now faces.

The last two years, in which the pandemic and now the war in Ukraine, have added new factors of instability, have been regarded by the Company as a chance to mobilise its teams around its most structurally significant projects. We have accordingly pressed ahead with our responsible management agenda for the next decade, the 2030 Agenda. We have stepped up our support for employees, developed plans to decarbonise operations and reduce water use, we have increased investment in forestry and involved our R&D teams in a programme that culminated in the launch of new tissue products and an internationally pioneering new range of packaging papers.

Navigator decided to look at the changes in the world in which we live as a challenge to get out of its comfort zone. And as a result we have embarked on a new cycle of investment,

innovation and diversification that positions us robustly in relation to new opportunities. Starting from forests, we have developed renewable, recyclable and biodegradable bioproducts to substitute fossil-based materials. We have increased our energy production from renewable sources and reduced our use of resources.

This is a pathway to creating sustainable value, that makes an invaluable contribution to facing the challenges of climate change and biodiversity loss.

Very recently, the From Fossil to Forest agenda for sustainable packaging products able to substitute fossil-based plastics, led by Navigator Paper Setúbal, was one of the projects given the green light for implementation under the Recovery and Resilience Plan (RRP). In total, this agenda is expected to generate 17 new products with a high level of value added. As well as adding value to Portugal’s forests, the new portfolio will make a decisive contribution to building up Portugal’s capabilities in the fields of Research and Development and Innovation (R&D&I), with positive effects on the trade balance.

On another front, we announced in July an agreement in principle for the founding of P2X Portugal, a joint venture with the German company P2X Europe. Under this agreement, we plan to develop a state-of-the-art industrial facility in Figueira da Foz for large scale production of non-fossil aviation fuels. These carbon-neutral fuels are known as e-SAFs (e-Sustainable Aviation Fuels) and are synthetic jet-fuel (kerosene), produced from green hydrogen and biogenic CO₂ from our biomass boilers.

Dealing with change and uncertainty is a task that each of us has to face, but we will only succeed if we do it together. I would draw special attention to the role of organisations, which bring people together, with united ambitions and strategies. Planning and motivation are factors that give us the edge.

Uncertainty does not have to be a limitation. Instead, the reverse is true. It has the ability to awaken the best in us all. ●

How many animals and plants can
you see from your window?
From ours, we can count 245
species of fauna and more than 800
species and subspecies of flora.



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