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## The Role, Scope and Management of R&D and Innovation in the Wine Sector: an Interview with Antonio Graca

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**Abstract.** Antonio Graca is Director of Research and Development at SOGRAPE VINHOS and an eminent figure in the Wine Business. With this extensive interview, he shares his thoughts and views on many key aspects of the business, starting with the role of R&D and innovation and the connection between academic research and the operators of the wine sector. The experience and knowledge that emerges from this in-depth conversation can represent a precious source of inspiration for researchers, managers and all the stakeholders in the sector, as it sheds a light on many key issues in the way to success in the wine business.

**Keywords:** wine business, R&D, innovation, management, leadership, interview.

**PH:** Antonio, you are very well known and respected across the wine sector for your commitment to, and considerable influence on, R&D and innovation not only within your company, but across Portugal and the broader international community. Your activities are diverse, embracing a market focus in defining R&D programme development and extending across a wide field of interests from genetic diversity, climate change mitigation and adaptation to sustainability, amongst many others.

Might I therefore open this discussion/interview by asking what first motivated your interest in grapes, wine, and the business of wine; was it your early upbringing, exposure during schooling or university or some other avenue?

**AG:** I was born into a family that always had professional connections with wine, Port wine, that is. My father and uncle both worked for competing Port companies while my grandfather, a printing entrepreneur (before digital times) supplied all type of barrel marks, wood case engravings, white seals to most Port companies. Further back in my lineage there were other people working in the wine business. You also must understand that, in Portugal, wine is a staple, an element inseparable from food, always present at every table, a part of our collective history, culture and lifestyle. Wine was there, since ever. Having close relatives in the business, made it a recurring topic at family gatherings. I remember, since a very early age, being fasci-

nated by tales of growers and vineyards, harvest, of coopers and sailors, of winemakers, tasters and blenders, the cosmopolitan feel with so many non-Portuguese names working the business and the praise those wines received in international markets. My father, especially, has always been a fantastic storyteller, listening to him is always a wondrous experience. My mother, on the other hand is an innate naturalist, with a special understanding of plants. We spent my childhood and early teen years living in a very rural area of South Portugal and in that period, she awoke in me the love of nature and the curiosity for its discovery making me realize the knowledge trove therein and the recurring cycles providing never-ending opportunities to experience again what you missed last time. I was not explicitly groomed to get into the business in any way but looking back I guess it would be hard not to.

**PH:** In your present (and perhaps recent) roles, you facilitate and mentor personal and professional development as you engage with many organisations and individuals; may I ask how you transitioned from pursuing your individual, scientific and professional development to that where you more broadly foster the careers of others, the development of the your employer company SOGRAPE VINHOS, and for that matter, industry?

**AG:** It was evolution, adaptation. At one point I just realized that if I aligned my personal goals with those of larger organizations my sphere of influence would expand, opening opportunities that would be much harder to get on my own, maybe even downright impossible. The hardest to do was to understand and clearly define what I thought could be my best contribution. It took years. However, once I did, it became quite easy to identify those organizations that would open channels, leverage my efforts, provide fast-tracks and materialize ideas. It is not that I have been harnessing critical mass to fight uphill battles, quite the opposite. I dream goals, as unrealistic as they may seem but presenting a clear case to advance from the current state, the baseline. Next, I establish steppingstones to get there and wait for opportunities, for «stones» to emerge. When I spot one, I put all my effort to get my feet onto it and move closer to the goal. Of course, when you are in a network that shares your goals (an organization), you exponentiate eyes and brains looking for or creating steppingstones. If you combine organizations into more complex levels (companies, associations, federations, intergovernmental bodies, etc.), like the layers in an onion, you become able to align their goals together which, if supported by scientific knowledge, becomes a powerful «stone» mak-

er. For that, the opportunities provided by Sogrape's entrepreneurial stance and its own evolution as a family-owned company with a clear view of its purpose and how to achieve it, were always a strong lever. Today, a lot of my work consists of a constant evaluation of which goals from different organizations are in line or may be merged. The critical factor is always the human factor. The basic units of human organizations are human beings so I give the greatest importance to making sure people in organizations understand how goals can be shared and aligned and how each one's contributions will advance the organization's and their own personal goals. The key to tap into the immense potential of human beings is communication: clear, concise, and courteous communication. Hence my increasing dedication to facilitating and mentoring roles.

**PH:** Have you any thoughts on what might constitute the ideal combination of qualifications, experience (within and outside the vitivinicultural sector) and other attributes (soft skills etc.) which would best fit an individual for Research Development & Innovation (RDI) leadership and management in the current era?

**AG:** Besides a Ph.D. in life or earth sciences, I believe restless curiosity, an open but inquisitive mind, out-of-the-box creativity, courage to manage calculated risks and diplomatic skills to be of utmost importance for someone who wishes to make a difference in wine RDI. Wine science is a confluence of many scientific disciplines; therefore, they should be able to manage radically different areas of knowledge and understand more than just the basics for each and all of them. It's a job where you are constantly being humbled by what you don't know, leading to a life of permanent, intensive learning, mostly from others. Critical thinking is of the essence and they should quickly sniff out unsound science, unfortunately so commonplace today, from a distance. Someone playing such a role should think of themselves as bridge-builders, establishing connections where they don't exist, understanding the differences and the common denominators to bring the relevant people together, strengthening bonds, weeding out disruptive factors while anticipating future needs. Someone who is relentless in the pursuit of scientific rigour yet seasoned with a mild spray of non-conformism and an overt loathing of dogma. Someone who can successfully match history with a vision of the future, tradition with innovation. Finally, someone who excels in the art of communication, not just scientific but more than anything else, layman communication. This is a role that permanently requires the summarizing of knowledge,

concepts, ideas and outcomes, so concision is key. But so is translation in all its forms, between people of different backgrounds and scientific disciplines, researchers, entrepreneurs, policymakers, teachers, journalists, technical staff, and common citizens. This is an era of fast change and someone who wants to lead that change needs to be prepared to change faster.

**PH:** Understanding your strong focus on quality research to inform company and industry development, I then have several questions for you relating to development of industry capacity along with investment and management of R&D and its role in supporting your company's strategic objectives:

**Q:** Do you see R&D largely as a means of resolving production, supply chain or market problems, or does it also offer a means to generate opportunities, then test and calibrate the company's potential to address current imperatives and future priorities?

**AG:** Actually, I think R&D is meant to perform both roles and there is even a third one: it offers a means to dream the future, to break the boundaries created by the current reality and the past originating it, allowing us to imagine ideal worlds and tools and approaches that do not exist yet. Then, identify the course of action, pick up the right tools and start opening the path that would take us there. It is probably the most powerful aspect of R&D and companies who devote a sensible share of their effort to it are the ones that usually lead development and innovation (and growth) in their sectors.

**PH:** So you see the most powerful potential of R&D is the generation of dreams and visualisation of opportunity, providing the foundations and mechanisms from which to successfully adapt and innovate; there's clearly potential for many who are prepared to act on this advice!

**Q:** Within your experience, what are the key elements underpinning the most successful models of company or industry-wide adaptation and innovation? (top-down, bottom-up, strategy driven, team-based---); perhaps some examples?

**AG:** In 2004, just one year after I started Sogrape's R&D department, over a glass of Shiraz in a Melbourne restaurant, I made that very same question to a researcher I respect a lot who had worked for a US company, arguably the one having the largest private wine R&D department ever. She told me that success lies in the intersection between top-down and bottom-up, because that is when you maximize all possibilities. It was advice I never forgot and going back home started to apply that concept to our strategy, generating an inventory

of knowledge gaps at the operational points where they were identified and establishing links with the overall company strategy for development and innovation. To materialize it, I insisted on having two meetings every year with the company's senior management and shareholders where identified gaps were compared to research avenues that could be pursued to solve them. In these meetings, finished, ongoing and pipelined projects were presented as a function of where they fit in the overall company's strategy and by doing so, a few years later we were getting our R&D effort more and more in tune with the company's purpose, vision and mission. At the end of the day, this was building a bridge between practical needs, strategic options, and the scientific offer. Our first project to be funded by a national program for business R&D was named ICONE – Integrating Coherently and Optimizing Nodes of Excellence, a fancy name for a bridge between the company, high-tech SMEs, national and international universities. The project aimed at gaining collinearity between market needs, oenological production, and viticulture and so it did. Among many other important outcomes, we were able to bridge the old gap between grape growing and winemaking by adopting precision farming technologies. Today, the science of sustainability is strengthening another bridge across the also traditional gap between production and marketing. Bridges, convergence points and intersections are for me the essential elements of successful R&D wherever you do it because they enlarge your spheres of possibilities while allowing you to retain focus on your priorities.

**Q:** Is research in the wine business mostly a competitive advantage tool that companies should pursue independently and in competition with each other or is it a cooperative endeavour for joint progress?

**AG:** I have always been very careful by not mixing either of those two approaches. I believe there cannot be cooperation "per se" between competing companies as that is against their nature as organizations. Companies are out there to maximize profits and returns on equity and investments and that means that any gain your competitor has is a gain you lose. However, there is an interesting concept that was proposed under game theory by Von Neumann and Morgenstern and later developed by John Nash (of 'A Beautiful Mind' fame) and others. That concept is cooptation, that is, cooperating for the basic conditions that allow your business to build on shared resources while competing for market and consumers. So, from an early stage I started to rank research projects in terms of cooperative or competitive, developing the former as shared, networked projects that would produce capacities, skills and knowl-

edge while self-funding competitive projects that would translate into competitive market advantages and innovations. The distinction is not always an easy one, and it takes luck and a fair amount of good judgement to avoid mistakes. Hardest of all is having public research institutions understanding the fine line separating them (that is, the cooperative or the competitive approaches), most especially at a time where it is self-evident that research materializes results and progress much quicker when done under some level of collaboration with private companies.

**Q:** What types of scientific journals, abstracting services and industry publications do you regularly read or scan, and how do they inform your thinking, strategic plans, and project execution? Have you any suggestions how these might better support industry innovation and progress? What is the role and the performance of wine specialized press in raising awareness for wine research – in R&D teams – in the business? What other entities or fora inform and influence your perspectives? Do you (or your team) have any scheduled methodology or specific tools for doing that?

**AG:** My best source of knowledge is the global network of scientific contacts we have been building in the last 15 years. A careful choice of who to follow in Research Gate or Google Scholar does wonders to keep you in tune with the latest research coming out of labs across the world. It is important not to stick just to grape and wine researchers. More and more of early awareness of breakthroughs come from paying attention to other disciplines and evaluating the possibilities of their application to the business of wine. We still subscribe to grape and wine scientific journals and specialized press both under electronic and paper formats but most of the knowledge we gain there had already been published elsewhere, so if we want to anticipate trends and position ourselves at the start of the development of a new breakthrough for grape and wine, we have to have wider scanning, from architecture to quantum physics, from archaeology to neurology.

When it comes to research that is funded by public sources, I am a firm believer their results should be published in open formats, accessible to anyone, free of charge. I have seen the move of the European Union in that direction as very positive and inspiring. It would be great to see more of that happening elsewhere. PLOS is another great example and so is OenoOne a specialist open publication for the wine sector. I am hoping that these formats will develop more and become the format of choice for top researchers around the world to share their research. The recent boost towards open publishing

stirred by the COVID19 pandemic was reassuring.

Wine specialized press (the non-scientific type) is devoting more and more importance to science and research because their audiences are becoming more and more permeated by Gen-Y's and Millennials and these readers were born in a world where they can gain access to any knowledge and want to see beyond the label and marketing gimmicks. Twenty years ago, no one could care less whether Touriga Nacional was a native Portuguese variety or if Burgundy was produced organically or not. Today, these trivia became the matter of talk among a growing number of wine consumers, so publications follow the lead to explain wine matters. It still is quite incipient, from a scientific point of view, but the level of scientific terms, references and features you see today in the Wine Spectator, Just-Drinks or La Vigne is a far cry from just two decades ago.

So, we keep an open eye for all these sources and organize and index each relevant piece of knowledge in an internal technical database that is accessible to all technical staff in the company, searchable by author, keyword, theme, year of publication and other criteria. And yes, we have regular knowledge survey routines that target scientific publications, extension journals, books, specialized press, event proceedings and the odd feature that may pop-up in an innocent publication, filing them in the database under the same searchable structure.

**Q:** You will have observed significant changes in the type and style of project teams, internally or in the public sector, and in their project funding, structures, reporting and measures of success (KPIs etc) over recent years; have you any comments on how projects and their structure might evolve over the next decade?

**AG:** The major change was a higher concern with having companies involved in research projects and fostering contacts and collaboration between academia and companies. This, in Europe, resulted from the European Commission orientations towards funding programs such as Horizon 2020, a major boost for European R&D with a budget of 80 B€ to spend over 7 years. Grant proposal evaluation was much more focused on results' impacts and ensuing innovation. Yet, for the grape and wine sector, which in Europe still counts a very small number of companies with a clear focus on R&D and a lesser number of companies that have in-house R&D structures, this translated as many being lured into participating for the funding they would get and not as much for the knowledge and innovation they could obtain. In any case, R&D became understood as an activity that brings tools and possibly solutions for problems but that understanding is still a far cry from being

materialized in practical terms. An evaluation done this year (2020) by the Comité des Entreprises Européennes de Vins – CEEV, an industry representative in Brussels, found that while this sector represents a bit more than 8% of total European agri-food exports, its capture of Horizon 2020 funding was less than 0,6%, revealing a large loss of R&D funding for other, more R&D-happy, food sectors. The same lack of understanding and of common ground I identified more than 10 years ago still exists and is a looming threat for the European sector's competitiveness, one that is currently exploited by other wine origins with better integration between research and entrepreneurship. In Europe, with a few honourable exceptions, researchers only take companies onboard projects because funding initiatives force them to and because companies have data that otherwise they could not access, their main focus being to publish highly-cited scientific papers, solving companies problems being, at best, a secondary objective. Companies, on the other side, often lack the needed qualified staff and adequate organization to extract benefits from scientific knowledge and research, therefore joining research projects more for the funding they will get and less because they are confident they will have their problems addressed and solved. Also, often companies reject R&D because they are not ready to accept the investment risk it entails as an activity, even though that risk for most European countries is usually well offset by funding incentives.

**Q:** Do you see and understand that wine consumers are aware of and appreciate research efforts in the sector, and by extension, might research be better deployed as a marketing tool for companies?

**AG:** I don't think consumers equate spontaneously wine with research. A vast majority of consumers still eye the wine sector romantically not acknowledging the huge technical evolution that has occurred in the last 70 years. For them, research is stereotyped as a lab activity performed by public institutions or large-cap corporations bent on ruling the world! The association between wine and research won't come easily to their minds. Yet, the most recent generations, because of being quite wary of lack of authenticity, misleading ads and wrong choices social- and / or environmental-wise, are a lot more open to delve deeper into how wine is made, where it comes from and how their choice of wine impacts environmental and social issues irrespective of where their purchased product comes from. This opens an interesting window of opportunity for the grape and wine sector in terms of marketing messages, as there is curiosity regarding what wine producers are doing to produce a wine that is authentic, responsible, and sustainable.

Conversely, this also means that gone are the days of marketing by managing the consumers' ignorance. Marketing claims and overall branding including brand communication need to have clearly accessible, credible support information and producers must walk the talk if they don't want to risk being put off-market. These are the days where marketing needs to manage consumers' education.

**Q:** Regarding development of capacity within the sector, what do you see as the 3 main skills required of a researcher to be successful in the industry, and do you see a role for researchers in defining and supporting the training and education needs of aspiring wine professionals?

**AG:** Knowledge management, systems thinking, transformational communication. I think we live in a world where professionals are at a permanent risk to be overtaken by their clients or consumers in knowledge about their own product. In order to avoid that, professionals need to keep a good level of awareness of what is happening and, most especially, how do they and their organizations stand on critical fracture issues. For that, they need indeed support from researchers that will update them on the evolution of technology, new knowledge insights and breakthroughs from scientific research, their implications, expected impacts and potential threats. A professional that works supported by science is a professional that will be regarded as non-nonsense, up-to-date, dependable, and trustworthy. To achieve this, professionals need periodic contact with researchers that can translate even the most difficult and complex science in a message accessible by them, their clients, and consumers. Not all researchers are able to provide this; a careful cherry-picking is thus in order. Continuous training programs for wine professionals should therefore be setup with the participation of researchers but also important is to create always-on science helpdesks that allow professionals to react in a timely manner to questions and challenges they receive from the marketplace.

**PH:** Returning to some of the key issues around industry sustainability (TBL) and social licence, all of which have complex interactions and many competing interests, where and how might research best be directed to guide policy development and review, resolve tensions in resource allocation and ensure a long-term future for the wine sector?

**AG:** Many of the issues regarding sustainability collide headfirst with lack of qualification by wine profes-

sionals, the designation, ‘sustainability’, itself being a prime example as it is often mistaken as environmental protection and not triple-bottom-line. Here, again, transformational communication is of essence, researchers needing to first understand who their counterparts are, how they think and what is the common ground that can be used for a clear, successful communication. Communicating on sustainability and social license is such a minefield that the United Nations had to compile a guide to support their staff at the Environment Program. Science-based observations, initiatives and targets are, in my view, the only way to progress on those issues constructively, consequently and...yes, sustainably. Exactly because sustainability and social licence are complex, they require clear systems thinking, a skill not often found in researchers as they (still) are mostly trained to focus and dissect their specialty from everything else. However, these issues require an understanding of what is going to change in the whole system if you tweak something here or there. Approaches such as Life-Cycle Assessments need to be deployed to understand which is the net gain or loss from a specific change in the system. This is especially critical when dealing with policies which, by nature, affect a great number of actors in the system.

**Q:** Have you any suggestions on how governmental, intergovernmental and professional associations, nationally and internationally might be better informed and engaged regarding the potential of R&D initiatives to inform policy, prioritise funding and ensure industry and societal impact?

**AG:** Knowledge management takes first-row here. Peter Høj of The Australian Wine Research Institute (AWRI) at that time, wrote, already in 2003, that the vast majority of knowledge is produced outside any single organization and that successful R&D lies in tapping into that knowledge pool. It appals me at how little this critical activity is taken seriously by the majority of governmental, intergovernmental or professional organizations in the grape and wine sector be they national or international almost 20 years later. I don’t know one such organization in the wine sector in Europe that has a staff position with the continuous responsibility to manage access and awareness to publicly available knowledge. The few ones I know to perform some knowledge managing activity, at best, do it under a need-to-have basis, not like the routine activity made necessary by the current level of instantaneous knowledge production and dissemination. As a result, more often than not, policies are ill-informed, funding is prioritized as a function of political, not scientific criteria

and the impact is dimmed and a long way from what it could and should be. The simple creation of a Knowledge Manager position in those organizations would improve their R&D impact almost overnight.

**Q:** In a similar vein, but now directed to the industry itself, is research’s role adequately portrayed and understood among wine entrepreneurs and managers?

**AG:** I would say mostly not, even though a few companies, regardless of size or market relevance, did take R&D role seriously and by doing so, have risen among their peers. What baffles me is why others do not see and follow these clear examples. After some careful observation and even situations where I asked bluntly to shareholders and managers why they downplayed or ignored R&D as a business activity, I came to the impression that it has a lot to do with the experience and vision of each company’s senior management. Companies that have a Ph.D. among shareholders or senior management tend to have a better perception of the role R&D can play in raising their profitability. The same observation goes for companies having in the senior management, people who had previous experience in sectors that rely heavily in R&D, such as the pharmaceutical, software or chemical industries. In the grape and wine industry of today, research is still mostly seen as something to be done in university labs and not in companies.

**Q:** What are the greatest hindrances or blockers of adoption of research results in wine businesses?

**AG:** I am probably sounding repetitive, but in my experience, the greatest hindrance to research results adoption in the grape and wine industry is poor communication. Conversely, research projects where the final user (the person or persons, not the organization as a whole) participates since day one, offering opinions in hypothesis formulation, experiments design and results interpretation are the ones I have seen with fastest and most complete results adoption. Cocreation and coproduction are powerful and efficient concepts in R&D.

**Q:** Shall we see a rebalancing between discovery, design to objectives, innovation in product, processes, operating and supply systems etc?

**AG:** The irony lies in that in the grape and wine sector, by its own nature, research does happen often and innovation almost every day. More than a rebalancing, I believe that we will witness a progressive realization than many activities that are executed to sort out a specific client’s request, to solve a new problem or to address an identified opportunity, are in fact innovation

and research activities. They are now, just not identified as such and not part of a specific, systemic insertion in businesses' organizations. It is my persuasion that it is this systemization that will drive research's integration in business activities and materialize its potential benefits.

**Q:** Might there be more reliance on science and technology, scientists and technologists being embedded in the business and in multi or cross-disciplinary teams?

**AG:** Yes, I believe firmly that we are already seeing a growth in this reliance because of a growth in the average qualification of the grape and wine professional.

**Q:** What do you see as the 3 most pressing issues and 3 greatest opportunities amenable to being successfully addressed by well-designed, directed, and funded R&D? Have you some current examples to illustrate progress down that pathway towards clear objectives

**AG:** The three most pressing issues are:

- Pressure from health agencies to curb alcohol consumption.
- Climate change.
- Balancing resilience with efficiency from grape to glass.

The three greatest opportunities are:

- The Global Earth Observation System of Systems (GEOSS). Projects like MED-GOLD and the recently published Australia's Wine Future: A Climate Atlas are the very first hints of what may come after, from the integration of myriad sensors, space- and earth-bound that observe our planet in near-real time. The Destination Earth (DestinE) digital twin of our planet currently under development will make this potential accessible to everyone opening a whole new way of understanding farming, agribusiness and consumption through real-time data integration.
- Biodiversity. Policies such the European Green Deal and the Farm to Fork Initiative open a much-needed window of opportunity to reverse biodiversity loss and secure this fundamental resource for all businesses and industries. The recent call to action from the Business for Nature initiative has joined 600 companies across the world (just 3 wine companies, one of which Sogrape), totalling over 4.1 TUSD in revenues in a stern warning to the UN that more measures are needed from national governments to conserve nature and secure the estimated 44 TUSD of global GDP at risk from nature loss.
- Wine in Moderation. This project itself is a great opportunity that can be made into huge market potential if carefully and well-designed R&D is

applied to scientifically unravel the nexus between the role of wine in balanced diet and lifestyles and its direct effects in the health of moderate wine drinkers. This initiative, that has known so far limited success, demonstrated that the wine sector is willing to self-regulate and promote sustainable and responsible consumption. It was, however, not as successful in deterring health agencies across the world from using unsupported claims and even bad science to implement ill-advised policies curbing wine consumption. A global coordinated research effort to find scientific answers to the right questions, has the power to get policies back into a science-based framework that may have an audible voice even in the WHO.

**Q:** The Covid-19 pandemic has affected our society in an unprecedented way. What do you think were the most important consequences in the wine business? And what lessons can we learn from it to move into the future?

**AG:** I believe the pandemic boosted the sector's resilience by showing that such a disruptive event could be handled without major disruptions to production while reducing exposure of the people involved in this production system. Challenges are more in the drop of economic value being traded rather than in volumes. I believe we need to rethink our business models and adapt to the situation, namely in increasing the diversity of options for distribution and sale. As an example, take-away restaurants are not new, but how many wine companies have targeted this specific way of buying wine offering solutions that can be beneficial for both take-away owners and clients? The pandemic had the virtue of showing these types of uncared-for niches that can then become mainstream solutions overnight as a result of a catastrophic event. Identifying them, designing specific solutions to increase the value being traded through them will not only provide for a more resilient sector but also provide increased revenues under so-called normal situations.

**PH:** Finally, recalling that you have a rich life outside the wine sector, what other cultural, social and recreational pursuits have you that allow you to escape from an intense engagement across our sector, but also refresh and energise you to continue your contribution? Perhaps they may even translate directly in some cases!

**AG:** My «rich life outside the wine sector» is a life where wine still plays an important role. In Portugal, wine is an everyday presence at every table and our rich

cuisine is a great match for the vast diversity of wines we produce. I enjoy every aspect of wine: the emotions it elicits from our senses, the interplay it has historically played in the development of the human race as a civilized and civilizing species, the art it expresses through the craft of farmers, winemakers or sommeliers, the tamed natural world it lays within our grasp when in a vineyard or when tasting the climate bound in every sip. Wine is for celebration and for introspection. It offers countless hours of storytelling to thrill my friends and it is a warm friend when I need to sit alone considering my place in the grand scheme of things. I try never to cellar more bottles than those I can consume, alone or in good company, in the space of one year and I am always on the lookout for wines I never tasted before and the unsuspected sensations they keep for my enjoyment.

Despite and through my passion for wine many other interests fill my life. I am an undecided person when it comes to wave some interest away in favour of another. Being an innate universalist, my greatest frustration arose when I discovered as a teenager that I would not live enough to experience or learn about everything my curiosity lands on. So, I devoted my entire life to reducing the number of things I will never have the chance to discover and thus, became interested by science and research.

The most interesting subject I have ever found is people. The endless learning opportunities to discover the amazing offers every other person has in store for me led to the creation of my life motto: searching undaunted for the novelty in every human being. It is something I cherish within the realms of loved ones, friends or the stranger who sits near me in the train or airplane.

I enjoy and appreciate most art forms, but only one elicits in me the same inner and primal response as wine does: music. The same way wine allows me to travel through time and space, music allows me to transcend reality and consciousness. Both touch what I call my soul, delivering my emotions from the strict and rigorous grip of the scientific method and allowing my imagination to run wild and free. I keep an incredibly eclectic and dynamic selection of music genres in my car music disk, ranging from Portuguese fado and Balkan techno to Seattle grunge metal and Australian white reggae, my first criteria when choosing a new car being the quality of its high-level sound system.

I devote a great deal of time to learning history as a tool to understand the present and prepare the future, avoiding mistakes already made. I have a profound respect and proud admiration for the improbable outcomes my Portuguese forefathers achieved when they

decided to brave the ocean and went off the last rocky tip of the Eurasian western end of the world. Today, because of them, this obscure, hard to master, language made from mixing Roman, Celtic and Arabic is the 3rd most spoken European language in the world. Because of them, I can go to West Africa, South America, India, Sri Lanka, Singapore, Malaysia, Macao or Indonesia and find native people who can, not just communicate in Portuguese, but also show me the local buildings and monuments that carry the unmistakable lines of Portuguese architecture and say, bursting with pride, that they too ARE Portuguese, even though it has been centuries since they lived under Portuguese rule. How a small kingdom in the periphery of medieval Europe with less than one million people achieved such an outcome never ceases to amaze me and everybody else, who foreign to this country, takes the time to discover its unique history.

My final word goes to that entity whose omnipresence shaped my life, being at the same time, a playground, a soothing vision, a place for imagination and a support for meditation. I mean that entity after which, in all fairness this planet should have been named after: the Ocean. No one can claim being a Portuguese without having a special relationship with the Ocean. As a Portuguese, it defines my citizenship, my culture, my social universe and my spirit, in brief, my place in the universe. The Portuguese Ocean, that is, the oceanic area under Portuguese sovereignty is 19 times the size of its land surface, equivalent to half of India. Nowhere is that notion more felt than in any of the 9 Azorean islands, tips of underwater mountains of the Atlantic ridge, places of volcanic fire encased by the sky and the ocean. Not living in those islands, the mainland's oceanic coastline has been for me the place for redemption from the pressures of everyday life or professional stresses. Every weekend I spend time strolling along it, my gaze lost in the immensity. If the human spirit is constrained by the limits of the reach of the eye, the ocean is that place where the spirit breaks all boundaries and becomes one with the infinite universe. Looking at the ocean, no impossibility lingers, no worry remains, freedom becomes the framework where all thoughts and the wildest ideas gain life and material possibility. Without the Ocean there would be no Portugal and I would be a very different person indeed, who knows...

**PH:** Antonio, my sincere thanks for your most generous and expansive responses in this interview, addressing not simply the pragmatic, elements of R&D as influencing the international wine industry, but also disclosing equally important aspects of your systems- view on society, ecology, economics and the market. Above all,

your preparedness to engage, facilitate, mentor and to apply philosophical principles to your professional and personal life shall, I hope, offer considerable inspiration and future guidance for many readers.

In particular, I trust that interviews and influencers such as illustrated here, shall assist in generating innovation in the Wine Industry R&D and Innovation nexus, to the enduring benefit of all stakeholders.