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The University the King Built

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The crystal into which Osman Bakr peered to see the future was of the perovskite variety. A semiconductor material with a surprising capacity to absorb the energy from light, perovskites were until a few years ago a puzzle. "We knew what they did, and now we needed to know their fundamental properties, their ultimate potential as semiconductors," Bakr, a 36-year-old materials scientist, told me.

Perovskites have been emerging as a potent challenger in the vast solar-cell research enterprise. Like others, Bakr saw opportunity; the problem was that his research focus had been on nanoparticles, not perovskites. Heeding the call of the perovskites meant reordering the research priorities of his team.

The difficulty of such a reordering will hardly surprise. It's a grueling process of paperwork and trade-offs, entailing mind-numbing hours of drafting grant applications, expense projections, and statements justifying the utility of research whose outcome isn't known because it hasn't been done yet. All of this while the clock is ticking.

Yet all of this Bakr did not have to concern himself with. At King Abdullah University of Science and Technology (or KAUST) in Saudi Arabia, where Bakr is an associate professor, an unorthodox arrangement for funding and organizing research meant that the materials scientist could skip the paperwork, allowing him to follow his intuition almost immediately.

Other researchers had created perovskite crystals only at the microscopic level. Bakr reasoned instead that fashioning large single crystals would allow him to study the material's potentially unique qualities as a semiconductor. Working with six other KAUST professors, along with several Canadian and American researchers, Bakr succeeded in doing just that. This feat of combining materials science and spectroscopy paid off handsomely, earning him and KAUST their debut on the pages of *Science* in 2015 and placing the oil kingdom's experimental university on the global map of solar research. The Saudi scientist is happy to share the credit: "We couldn't have made the switch in this manner anywhere else," Bakr said in one of a series of interviews in 2016 and 2017.

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KAUST (pronounced "koust") is self-consciously experimental. Many aspects of how it operates are novel, and not just for Saudi Arabia. It's a university, but it does not offer undergraduate degrees, or tenure for its professors. It's an avowedly national institution, carrying the name of King Abdullah and originally backed with an eye-popping endowment from government funds, but one that is now managed independently by an international board. It maintains the traditional department–discipline arrangement for its course offerings, but organizes its research around goal-oriented interdisciplinary "research centers," such as the Advanced Membranes and Porous Materials Center and the Clean Combustion Research Center. It is in Saudi Arabia, but it is the first Saudi university to enroll men and women in the same classes.

In each of these choices, KAUST's architects have sought to strike a compromise between competing interests or divergent audiences. Thus, for example, to attract Bakr-caliber talents to work in Saudi Arabia, and to compensate for the absence of a tenure-track option, KAUST offers luxurious freedom from the rat race of grant applications. To offer tenure to non-Saudi professors would have required reforming the kingdom's laws to permit permanent residence for immigrants.

Beneath all the circumstantial compromises and balancing acts is a two-fold attempt at major change. The founders of KAUST wanted to establish a world-class research institution to help modernize and transform Saudi Arabia. They also recognized that science institutions in Europe and North America are wrestling with deep bureaucratic and funding challenges. For even in traditionally science-friendly environments like Britain and the United States, the grant application process has become too ponderous for researchers, too much a drag on productivity. By offering easy access to the money needed for research, without the regulations imposed by cash-strapped funding agencies, KAUST's planners wagered that they could attract the world's best scientific talent.

But there are signs that these have been fraught bargains, both for international scientists and for Saudi Arabia. In exchange for relief from the burdens of grant applications, unreliable funding, and time-sapping teaching commitments, researchers must work in a country whose values and politics they may find alien, or even flatly detest. Saudi Arabia, in turn, gets to tap into pools of top, otherwise inaccessible research talent and host scientists whose work may help with the kingdom's long-term goal of diversifying the economy and lessening dependence on oil. But in order to offer an environment that is internationally attractive—including more relaxed social rules than those typical of Saudi Arabia—the KAUST

campus is walled off from the rest of society, limiting the university's social impact and its ability to create a robust scientific community in the country.

The sustainability of these bargains is not a foregone conclusion. Maintaining them requires KAUST to accommodate or contend with factors beyond its—and, at times, the kingdom's—control. These include immigration laws that cannot allow tenure for non-Saudis, an environment with only unsteady support for science careers, and an unstable region that may scare away many prospective recruits among both students and faculty.

Satisfying the many sides of the bargains forces KAUST to perform a delicate dance. In order to maintain its world-class standards, and remain the international environment its founders envisioned, it needs to stay at a distance from the tug and tangle of forces in the Saudi society. At the same time, to become a catalyst for change, lending its ways to other higher-education institutions and winning over skeptics, it will need to engage more with the Saudi universe beyond its walls. How nimbly KAUST performs the dance will likely determine how its future unfolds.

Getting Beyond Oil

Osman Bakr is one of those rare millennials who welcome a commute. Unlike nearly all other KAUST faculty members, he drives to the KAUST campus in Thuwal (pronounced "thu-well" or "tu-well") from his home in Jeddah. The trip takes over an hour, riding along the coast of the Red Sea. His decision, he said, was born of a necessity. The commute is his way of maintaining interaction between the university and society, of "interfacing."

This separation, and the need to bridge it, has existed from KAUST's outset. In one sense, KAUST faces away from Saudi society, toward the universities of North America and Europe, speaking to their institutional problems and their dissatisfied talent. In another sense, it fixes its gaze on Saudi Arabia's own problems, particularly the kingdom's dependence on oil as its main source of income.

To be sure, economic diversification has been the kingdom's official policy and aspiration since its first five-year plan in 1970. But as the regime splurged through the oil booms of the mid-1970s—and later muddled through the busts—the goal of diversifying the country's economy away from the caprices of oil markets was perpetually placed back on the agenda, to little effect. In 1981, with oil prices near then-historic highs,

oil minister Ahmed Zaki Yamani warned, "Saudi Arabia's interests lie in extending the life span of oil to the longest period possible to enable us to build a diversified economy supported by industry, agriculture, and other endeavors. Unless we do that there will come a time when this developing country will receive a violent shock."

Yamani's words turned out to be wise. The late 1980s proved especially rough for the regime, with tumbling global oil prices, a contracting GDP, and palpable disaffection at home, and then oil revenues got even worse in the long slump of the 1990s. In late 1990, a group of prominent intellectuals, businessmen, and former bureaucrats issued a petition calling, among other things, for education reform: "We believe that our country's educational system is in need of comprehensive and fundamental reform to enable it to graduate faithful generations that are qualified to contribute positively and effectively in building the present and the future of the country, and to face the challenges of the age."

The Al Sauds, the ruling family, had a heightened sense of crisis. Then–crown prince Abdullah bin Abdulaziz—the later namesake of KAUST—led the charge for change on several fronts, with bold measures to shore up government finances and open up the kingdom to foreign investors and competition.

In the early 2000s, oil prices finally began a steady rise, replenishing government coffers and affording the Saudi leadership breathing space. And as the crown prince became king in 2005, the sense of urgency for doing something about the oil question did not slip to the background, as it largely had done before. King Abdullah began devoting about a quarter of the government's annual budget to education, opening more than a dozen new public universities, including a handful for women.

But that was not going to produce outcomes fast enough. The kingdom solicited advice from veteran academic administrators in North America and Europe and from consultancies on ideas to shrink the duration between research and the development of knowledge-intensive products. The thinking settled on a model that was previously untried, though not unheard of in policy circles in the United States: a synthesis of two concepts, the national lab and the research university. Like national labs, KAUST was to focus exclusively on research in predetermined areas. Like research universities, it was to grant master's and doctoral degrees, a necessity to produce the human power Saudi Arabia needed. But no undergraduate degrees.

The decision to skip undergraduate degrees stemmed in part from KAUST's mission as a research institution. With no responsibilities to

teach undergraduates, faculty members would have more time to devote to research.

Publicly, officials claimed, as a 2009 article in the journal *Science* reported, that they "decided to make it a graduate-only university so that it wouldn't compete for undergraduates with existing Saudi institutions." Another reason was to shield the university from the unpleasant consequences of opening up an undergraduate university in Saudi Arabia, according to two people familiar with the early discussions who wished not to be named in order not to violate non-disclosure agreements, or because of ongoing relations with KAUST. The risk was that a new and well-endowed university offering undergraduate degrees would confront high demand from Saudi students. Apart from this being a big challenge in itself, it would invite the temptation for nepotism to circumvent high admission standards—a problem that beset other Saudi universities in the past, and could have tarnished KAUST's image. Also, opening the floodgates of undergraduate programs would have gone against the aspiration of presenting KAUST as an elite, research-focused global university.

KAUST wanted an international character, with a diverse, and relatively small, student body—reportedly aiming for about 2,500 at maturity, working with 250 faculty members. In job listings for faculty positions, KAUST succinctly states the sales pitch: "Faculty members enjoy secure research funding from KAUST. . . . an international, graduate-only research university."

But despite its desired image, and significant international involvement in its early planning, KAUST has always been a national project. As *Science* has reported, although its planners had solicited international advice and initiated partnerships with Western institutions to help get it ready for launch, KAUST splashed into existence and was introduced as a national landmark, complete with a grand opening in Riyadh on the holiday celebrating the kingdom's founding, featuring King Abdullah himself and several heads of states and Nobel laureates. As the brainchild of the king, KAUST received an unprecedented endowment—initially $10 billion but since grown to $20 billion—from government coffers. Among the key managers who had shepherded the KAUST project from the drawing-board phase to reality were Saudi Aramco, the state-owned oil company, and Ali Al-Naimi, the former oil minister, now chairman of KAUST's board of trustees.

Out of the KAUST experiment, Saudi leaders hoped to get a fast engine for economic transformation—according to the university's 2008 articles of governance, "a catalyst for diversification of the Kingdom of Saudi

Arabia to a knowledge-based economy," away from its long-dreaded reliance on oil. KAUST was designed to deliver this by being "a world-class research university" that plugs cracks in the global research enterprise.

Funding Woes and Remedies

KAUST's and Osman Bakr's careers coincided from the start. KAUST officially opened its doors on Saudi National Day, the anniversary of the kingdom's establishment, in 2009, the year Bakr received his Ph.D. from Harvard in applied physics. The new campus offered the young scientist his first professorship; he joined as a member of its first cohort of recruits.

Back then, Bakr recalled, KAUST "was at times run like a corporation, heavily top-down." He attributed that to the early involvement of Saudi Aramco in both running the university and building its facilities. And like a corporation, KAUST was born eager. It had initiated research partnerships with universities in Western Europe and North America even while the campus site was still all cranes and scorching sun. After the launch, the campus labs not ready? No problem. KAUST faculty could use labs in Europe or farther away to do their work. The housing for faculty not ready? Hotels in Jeddah filled the gap, with some faculty staying for months on end. The priority was to kick the new institution into motion fast.

You would find the hurry understandable if you recall that the world that first greeted KAUST was the one shaken by the global financial crisis of 2008. In the United Kingdom, the crisis meant reduced science funding, with £600 million cut from the government budget for higher education and research. In the United States, total public and private spending on research and development fell by $1.8 billion from 2008 to 2009, leading to reduced hiring of faculty at universities, even as enrollment surged with unemployed workers going back to school. Private institutions relying on hefty endowments were not spared. Dartmouth College, for instance, saw its endowment lose $220 million in a single quarter in the wake of the financial meltdown. The timing couldn't have been better for KAUST to tap into a larger pool of recruits.

The financial crisis deepened research-funding woes, but it had not created them. In the United States, the federal government's stimulus package enacted after the financial crisis included close to $20 billion in new funding for scientific research between 2009 and 2010. But federal research funding has been inconsistent since then, with levels in 2013 falling below what they had been in 2007, and another dip in funding between 2014 and 2015. Steven Weber, a professor at the University of

California, Berkeley who advised several Gulf governments on economic development projects, told me that relatively slow growth in funding in the United States and Western Europe "presents an opportunity for countries with plentiful money to jump in"—countries like Saudi Arabia, Qatar, and the United Arab Emirates.

The trend had been long in the making. Fawwaz Ulaby, KAUST's founding provost—who left in 2009—told me in an interview that the growth in public funding for research in the United States has not kept pace with the expansion of universities since the middle of the twentieth century, intensifying the competition for research dollars. It thus became the norm that a faculty member would spend about a quarter of his or her time on research-grant applications, with a success rate between 10 and 20 percent, Ulaby said. The upshot is that the process of getting research money entails substantial "overhead cost."

Ulaby's contention, while broad, is plausible. Success rates for the most common type of grant applications to the National Institutes of Health fell from 58 percent in 1962 to 19 percent in 2017. A 2009 study by a Yale researcher found that 42 percent of the time federal grantees use working on their research projects is spent "on administrative tasks related to that project rather than on research." And a 2015 *PLoS One* survey of astronomers and psychologists applying for U.S. federal funding found that the average grant proposal took 171 working hours to complete.

The dearth of research funds, Ulaby argued, produced an unforeseen complication: a mushrooming in regulations. Federal and state leaders were pressured to ensure that taxpayer dollars were spent prudently, confronting faculty members "with stacks of rules and regulations."

Those were the woes, and KAUST proposed remedies. Or rather, the very concept of KAUST was crafted around solving one of the major challenges bedeviling the global research enterprise: the lack of enough money for the burgeoning population of would-be scientists. KAUST's endowment, reportedly $20 billion, is somewhere between the third and sixth largest in the world, depending on the ranking source. Only Harvard's $37 billion endowment and Yale's $27 billion are significantly larger. But with just over 150 faculty at KAUST—compared to around 2,400 at Harvard and 4,410 at Yale—the budget available for each professor is far higher at KAUST than the Ivies. "KAUST has the highest per capita funds in the world," Ulaby told me. Though difficult to ascertain definitively, the claim is plausible in comparison to other schools with large endowments.

An aspect of the solution was KAUST's two lines of funding for faculty. One line is the one-time launch funds for each new hire to pay for her

lab, speeding up the research and publication process. (Officials sometimes refer to these as "startup funds"—confusingly, since KAUST also makes venture-capital investments in startup companies.) In areas like spectroscopy, which Bakr relied on in his perovskites research, lab equipment can be prohibitively expensive. Thus the launch funds can help decide how fast the new faculty gets her first publications out. Jean Frechet, KAUST's vice president for research, said in an interview with *Nature Middle East* that launch funds can include up to $3 million in equipment alone.

The other line of financial support for faculty is "baseline funding." This, Frechet told me, "is essentially guaranteed funding that faculty members get year-in, year-out," so that "they pursue their research without having to spend all of their time writing proposals, or writing reports." Thus "our faculty can be very productive because of this freedom they have." In the *Nature Middle East* interview, Frechet said that this funding varies from $350,000 annually for early-career professors to over $1 million for senior professors.

That freedom entails an additional, if less direct, dividend. By removing administrative burdens, it also provides the liberty for researchers to be adventurous, to cross disciplinary boundaries more easily, to approach research puzzles on their own terms rather than adjusting their research projects to fit with a particular discipline's tools or expectations about what questions are worth asking. Few would dispute the advantages of this approach, but the prevailing funding practices in Europe and North America make it hard to do.

Consider, for instance, the quandary that confronted Xabier Irigoien, a marine biologist who until 2016 was a professor at KAUST and the head of the university's Red Sea Research Center. In his pre-KAUST career—which spanned Spain and the United Kingdom—Irigoien had done research and published on phytoplankton blooms. But he was finding it difficult to broaden his research agenda. He wanted to study the genomics of phytoplankton blooms to understand "who was winning at the genomic level," he told me. Getting funding for this line of exploration was a challenge because he didn't have expertise in genomics. The explanations that came back with his unsuccessful grant applications noted as much. At KAUST, that was not an issue, because Irigoien's baseline money allowed him to hire post-doctoral fellows specialized in genomics, and thus to proceed with his research in a new direction.

The baseline money also allowed Osman Bakr to repurpose his research group based merely on a good intuition that he should catch perovskites at the right moment—no signatures or committees or grant

applications required. Together, the launch and baseline funding components made the KAUST proposition "incredibly attractive," said Steven Weber. For Irigoien, the flexibility was part of KAUST's appeal. It "offered the possibility of doing brand new things."

The Kaustian Bargain

Using Saudi money to buy freedom from funding-agency burdens has its own price. Consider, for example, the tenure option for faculty. Saudi immigration law offers few paths to acquiring citizenship or permanent residence, which all but precludes tenure at KAUST. Most of the faculty interviewed for this article said their contracts provided adequate job security. Professors have five- to seven-year contracts. Assistant and associate professors have the option for promotion, and most full professors have "rolling" contracts—the contract is renewed for a five-year term every year until the professor reaches the age of sixty.

But the tenure option was considered during KAUST's early years. Some in the KAUST administration, including Fawwaz Ulaby, the founding provost, were in favor. Proponents of academic tenure often defend it on the grounds of protecting academic freedom—a different kind of freedom than the variety KAUST offers. Tenure at KAUST would offer another dividend: retaining faculty for longer, encouraging researchers to plan for larger time-horizons.

Absent that option, Osman Bakr said, KAUST's potential is undercut by the fact that its positions may be most attractive to researchers seeking shorter-term projects. This arrangement, he added, may generate publications and citations, and reflect well on KAUST as a research university, but it makes it harder for the institution to help grow a flourishing scientific community that benefits the country in the long term.

To be sure, the campus on the Red Sea has attracted highly respected researchers in its core fields. At the same time, it is still endeavoring to reach the full-capacity point, which, according to Ulaby, was originally estimated to arrive in 2013 or 2014. As of September 2017, KAUST had just 154 faculty and 1,000 students, falling significantly short of its reported maturity targets of 250 faculty and 2,500 students. And it struggles with a high turnover among administrators—the Solar Center has had four directors in less than a decade, according to a KAUST employee; president Jean-Lou Chameau left the job after four years, declining an offer to extend his contract, according to a local reporter; and Ulaby himself left after just a year.

What explains the scientific community's reluctance? KAUST's slow growth might have to do with its Saudiness. Regardless of how KAUST performs its dual gaze—outward to the world and inward to Saudi society—it can never be in control of how others look back at it. The Thuwal campus and its residents may view themselves as a contingent on a mission for science and some abstract transformation of the country toward a knowledge economy, insulated from the rough and tumble of the world beyond the walls. But the world beyond the walls still manages to barge in.

When a Saudi blogger was sentenced in 2013 to prison and flogging for posts critical of the kingdom's clerical establishment, denunciation of the punishment came from many quarters. One of those was a group of eighteen Nobel laureates who in January 2015 issued an open letter calling upon "influential voices" in KAUST to "be heard arguing for the freedom to dissent, without which no institution of higher learning can be viable." John Polanyi, one of the laureates who signed the letter, told *Nature* he couldn't view KAUST independently from the actions of the Saudi government, and that patience with that government was "wearing thin." "I think," Polanyi added, "the scholarly community has been slow to become aware that KAUST cannot be an island of freedom."

Over the last few years, the country has done little to ease worries about its stability. In June 2017, succession intrigue in the royal household played out in full view of the world as King Salman (Abdullah's successor in 2015) removed his nephew as crown prince, replacing him with his son, Mohammed bin Salman. Saudi Arabia has also been intervening in the civil war in Yemen since 2015, instigated separate diplomatic crises with Lebanon and Qatar in 2017, and has been escalating tensions with Iran.

Many potential faculty members continue to perceive the kingdom as a place that is socially and culturally oppressive, located in a region writhing with long-trend convulsions. That can make it harder for KAUST to recruit faculty and students of the caliber it is reaching for. "When I told my family I was going to work in Saudi Arabia they thought I was crazy," a European biologist who completed a five-year contract at KAUST, but asked not to be named, told me in an interview. Nonetheless, he was pleased with his stint in Thuwal.

In response to the flogging of the Saudi blogger, KAUST's then-president, Jean-Lou Chameau, also a former president of Caltech, counseled what could be read either as pragmatism or facile compartmentalization. In an interview with *Times Higher Education*, Chameau said that

he always preferred not to use his leadership positions at academic institutions to engage "political issues." He argued that KAUST's contribution would arise instead from when its well-trained graduates "go out and do great things…that's where we have impact."

"KAUST is not for everyone," Jean Frechet, the research vice president, reminded me. He also noted that the perception of the region is something that "varies enormously" between people. Yes, "the concept of coming here may not be universally attractive," but for a scientist or an engineer aiming to study or do research, KAUST offers good opportunities. Explaining the institution's appeal to scientists from Western countries who might be wary of coming to Saudi Arabia, Frechet observes, "If you're a scientist or an engineer what you look for is, 'Can I, if I go to this place, carry out what I want to do, will I do my work unhindered, will I reach my goals?' People in science and engineering think a lot about their mission, what they want to accomplish."

If KAUST's Saudiness is not exactly one of its selling points to outsiders, Frechet is also quick to point out that the Thuwal campus is not a typical Saudi university. KAUST is "indeed a university located in Saudi Arabia, but we are not a Saudi university," he told me, "in the sense of being funded by the Saudi government—we are not."

Frechet's formulation—in essence, that KAUST is in Saudi Arabia but not of it—is handy but perhaps oversimplified. KAUST was very much conceived and launched as a Saudi national project, spearheaded by the royals and prominent ministers, managed during its run-up by Saudi Aramco, and endowed with government funds. True, it has a special status among universities in Saudi Arabia—its independent, international governing body, its liberty from oversight by the ministry of education. Still, the trappings of KAUST's Saudiness are routinely on display. Its graduation ceremonies, for example, are kicked off with a recitation of Qur'an and the playing of the kingdom's national anthem.

Frechet's remark still captures a truth about KAUST: It is meant to be independent from the society in which it is planted, operating according to rules that are unique to it, divergent from those governing other research and higher education institutions in the kingdom. While Arabic is the country's official language, it is English that is the language of instruction at KAUST—though in at least one of the recently established women-only schools in the kingdom, English is nearly exclusively the language of instruction. KAUST was the country's first co-ed university, a move criticized by some Saudi religious leaders. And it is a university, but still one that does not admit undergraduates.

Although the institution exists in part for the benefit of the international scientific community, it is also a Saudi institution created to advance Saudi economic and social interests. But KAUST's insulation from Saudi society complicates its aim of modernizing the country's economy by fostering a community of scientists who, in Chameau's words, can "go out and do great things." As in the question of its ability to meaningfully advance science as a global institution in the long term, it remains unclear whether KAUST's model of generous funding and financial freedom for researchers will be enough on its own to deliver on its mission of national transformation.

Elusive Change

The immediate world into which KAUST's graduates could "go out and do great things" is Saudi Arabia. It is a world mesmerized by the Thuwal campus, but as a practical matter not very hospitable toward it.

James Smith, U.S. ambassador to Saudi Arabia from 2009 to 2013, argued in a 2014 interview that "if Saudi Arabia is to become a world economic power" it will need "a move toward critical thinking and accepting that critical thinking as part of their modernization process." But, Smith argued, KAUST remains too isolated from the rest of the country to have this kind of influence. The average Saudi is "not taking advantage of the commitment to KAUST because nobody understands it. You're hearing more and more from other Saudi educators, 'Why the investment in this castle over there when we have all these other needs at, quote, our universities?'"

But social transformation is a weighty responsibility for the university to meet. Since KAUST's earliest days, many perceived it as a dramatic break with more than the ways of higher education in the kingdom and its oil-dependent economy. It was, more broadly, an emblem of change. As early as 2009, according a diplomatic cable released by Wikileaks, the head of a literary club in Riyadh declared, "After KAUST, all things are possible." That was the Saudi intellectual's reply to a question from U.S. embassy officials about why he staged a concert with a mixed-gender audience.

The view from outside KAUST looking in, as is evident in columns in Saudi dailies, is that with its extraordinary resources, the university is supposed to be laying the fast track to transforming the economy. KAUST, understandably falling short of those expectations, is pressured to show some sort of progress to the Saudi world beyond its walls. Nearly everyone I talked to at the Thuwal campus was quick to point out a favorable ranking or metric by one or the other of the metrics compilers—Nature Index, SciVal, or others. For the last few years, for example, KAUST has

been given the highest possible score for citations per faculty member, according to the British firm Quacquarelli Symonds—a fact that KAUST is, naturally, eager to note.

In a 2016 keynote address to the *Times Higher Education* Asia Universities Summit, Jean-Lou Chameau, then president of KAUST, warned that in higher education in general, "We talk too much about outputs, about KPIs"—key performance indicators—"in part because we are driven by competition, marketing and possibly rankings." But he still ensured that his Hong Kong audience learned of KAUST's "remarkable record in publications and citations after only a few years."

In an interview with Chameau in 2016 shortly before he announced his departure, I asked him what the purpose of the university was. To be "a center of excellence in science, engineering, and technology," he said. "And good things tend to happen around these centers," he added, citing cities in Europe and the United States that mastered the art of the sci–tech–biz cluster. Ambitious though Chameau's words are, they also suggest something more modest than the hoped-for national "catalyst" effect.

Some of KAUST's administrators may have come to realize that making it into a "world-class" university, as demanding a challenge as that may be, is still easier than the other part of its dual mandate—turning it into an engine of transformation of the Saudi economy, and of science in the kingdom and the region. Focusing on metrics thus becomes a way for some in KAUST's administration to narrow the university's original, expansive mandate, a way of fixing the university's gaze inwards.

KAUST's unprecedented financial autonomy as a Saudi university, along with the relatively short time-horizons not only of foreign professors but of its top administrators—not only Chameau but his predecessor, Shih Choon Fong, left for retirement after serving for about four years, and, as mentioned, the founding provost, Fawwaz Ulaby, left after just one year—may also worsen the temptation for KAUST to content itself with what it already does, or can do, well. Fully achieving the transformation mandate would require a longer and broader engagement, reaching out to and engaging with a gaggle of actors, norms, and rules beyond the Thuwal gates. This is a task that the university, for all its resources, seems unsuited to perform.

A Precarious Bargain

As an invitation—both to Saudi institutions and to foreign researchers—KAUST is a triumph. It remains unique in Saudi Arabia for its embrace of

an explicit risk-taking and experimental ethic, one that may yet serve as an inspiration for change in other Saudi institutions. It is also a reminder to academic and funding-agency administrators around the world that experimentation for better arrangements for doing research is still possible.

"If KAUST works—and it is working so far," Osman Bakr told me, "we would be changing the perceptions about Saudi Arabia and the region." Yet over the course of my interviews with him, I could discern, gradually, a moderation in the Saudi scientist's aspirations for KAUST. When I asked about this, he was reluctant to give a direct answer, perhaps lest his words be misunderstood by prospective KAUST students and faculty, in Saudi Arabia and beyond. He instead pointed out from where his enduring hope for his university emanates: the Saudi families that continue to send their brilliant daughters and sons to get their master's and doctorates at KAUST. For Bakr, this anchoring into Saudi society affords KAUST resilience in the face of its sundry challenges.

But even while exciting research is being done within KAUST's walls, outside, the kingdom's capacity and rewards for careers in science and advanced engineering is limited. Saudi press and social media routinely feature stories of graduates with advanced, government-funded science degrees who were either unemployed, unable to find jobs that matched their degrees, or seeking jobs outside the country. And that can be disheartening, even to firm believers in the promise of science. A prominent Saudi physicist—who is published in international, first-rate journals, but asked not to be named—told me he discouraged his son from going into a career in science and recommended business instead. "A career in science is tough here—much work and little returns," he said.

So KAUST can simultaneously prompt excessive expectations and skepticism from the world outside its walls. And on the inside, many of the world-class scientists who are lured to KAUST by its generous funding arrangements can't or won't be part of KAUST's transformation agenda and are happy to stay for the duration of their contracts and then call it a day with Saudi Arabia.

Both the indifference of many scientists and the skepticism within the country about the institution's broader catalyzing goal complicate the mission of KAUST. While it can offer great opportunities for individual scientists who are willing to work there, the university struggles to provide the conditions for those scientists to engage with the broader society. Without stronger links between the university and society, even the excellent science done at KAUST won't be enough to bring about the hoped-for transformation of the Saudi economy.

And as a proposition for plugging a crack in the global research enterprise, KAUST's value remains uncertain. The campus's slow growth and high turnover suggest that the buy-in from the global science community is feebler, and the belief that "KAUST is not for everyone" more widely resonant, than its planners had anticipated. KAUST's existence and work over the past nine years may serve as proof of its foundational concept, but not of its sustainability. Given its nature as a set of bargains—with the international scientific community, Saudi leadership, and Saudi society—the KAUST project may yet unravel if any party demurs.