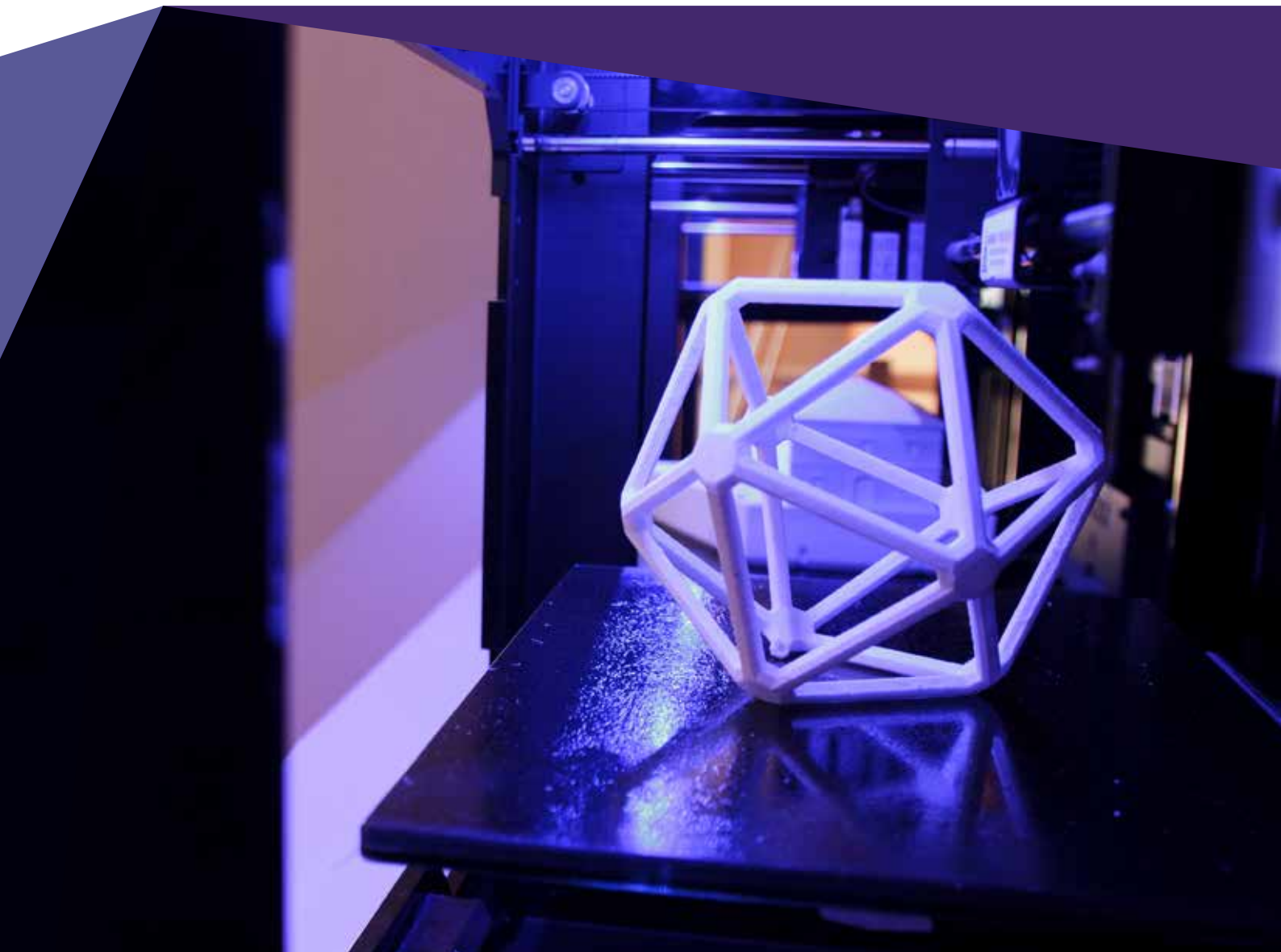


HOW CAN NATIONS PREPARE FOR THE INDUSTRIES OF TOMORROW?

"MAKE" IT HAPPEN – HARNESSING THE MAKER MOVEMENT TO TRANSFORM GCC ECONOMIES



The Gulf Cooperation Council (GCC) nations have spent the past decade seeking to diversify their economies, but a focus on traditional and/or existing industries and the exploitation of legacy resources has left them having to play catch-up with more developed economies.

Rather than following others' lead, it is critical GCC policymakers set their sights further up the value chain, developing the skills and capabilities needed to shape the industries of tomorrow, not yesterday. GCC countries, like many others across the globe, have an abundance of potential in their youth population, who are eager to adopt new technologies and new ways of learning. To support growth and nurture the ambition, talent, and drive of their youth, GCC governments should seed, catalyse, and enable the growth of the "Maker Movement." By leveraging GCC resources in creating and promoting the "Maker Movement", GCC nations could reap the rewards of youth-oriented innovation and entrepreneurship as part of their future development.

WHAT IS THE “MAKER MOVEMENT”?

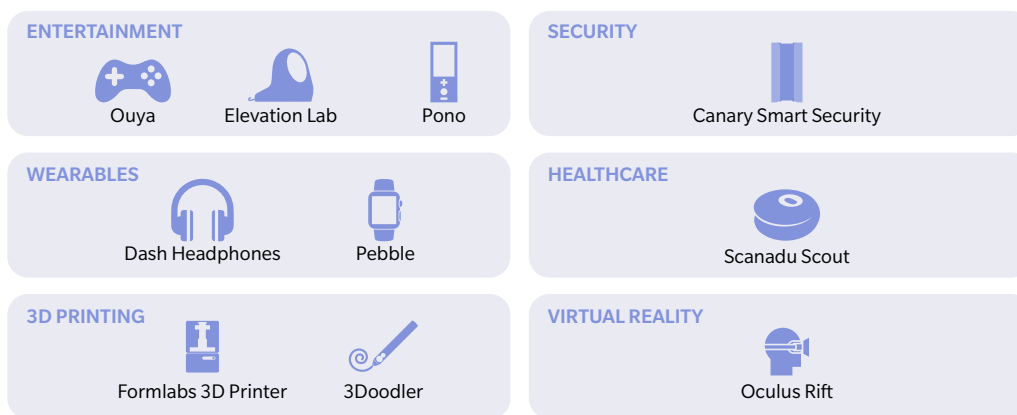
The “Maker Movement” is a rapidly developing global trend that values individuals’ ability to create new and innovative products or services. A technology-driven, do-it-yourself movement, it emphasizes learning through doing, in collaborative environments. The movement has given birth to many recent product innovations and a number of success stories, including Oculus Rift, Pebble, Canary Smart Security, among many others. (See Exhibit 1)

The Maker Movement has been enabled by technologies such as 3D printing and open-source code, and by the rise of social media and its ability to connect like-minded people. The movement has evolved into an ecosystem of platforms, which include Maker Spaces, hackathons, Maker Faires, and meetups where the tech-inclined gather to learn, become inspired, experiment, design, and build prototypes. (See Exhibit 2)

Other parts of this ecosystem provide sources for financing and tools for producing, marketing, and selling new products. The net effect reduces barriers to entry for creating, manufacturing, and marketing products.

Across a range of industries, the Maker Movement has yielded products and services offering new solutions for existing needs, or creating new needs with innovative propositions. With increased access and availability to the right enablers, new products – once the exclusive domain of large corporate organizations with sizable R&D budgets – are now being created in local neighbourhood maker spaces.

Exhibit 1: Examples of products birthed from the maker movement*



*Each product raised in excess of US\$3 million as part of their respective crowdfunding campaigns, the ones listed are the global top 10
Source: Kickstarter, Indiegogo, Forbes magazine

Over the past decade, the fast-growing Maker Movement has enabled individuals and startups to bypass traditional industry and rapidly bring-to-market compelling products and services better suited to consumers’ growing thirst for customization, innovation, and creativity. Advances in 3D printing and other technologies are rewriting the rules of manufacturing, democratizing access to high-end production tools. (See Exhibit 3)

Other options like crowdfunding and online retail now allow individuals to take ideas from concept to funding to production and to market all on their own.

Exhibit 2: Understanding the Maker Movement ecosystem

MAKER MOVEMENT ECOSYSTEM ROUTE TO MARKET AND PLATFORMS

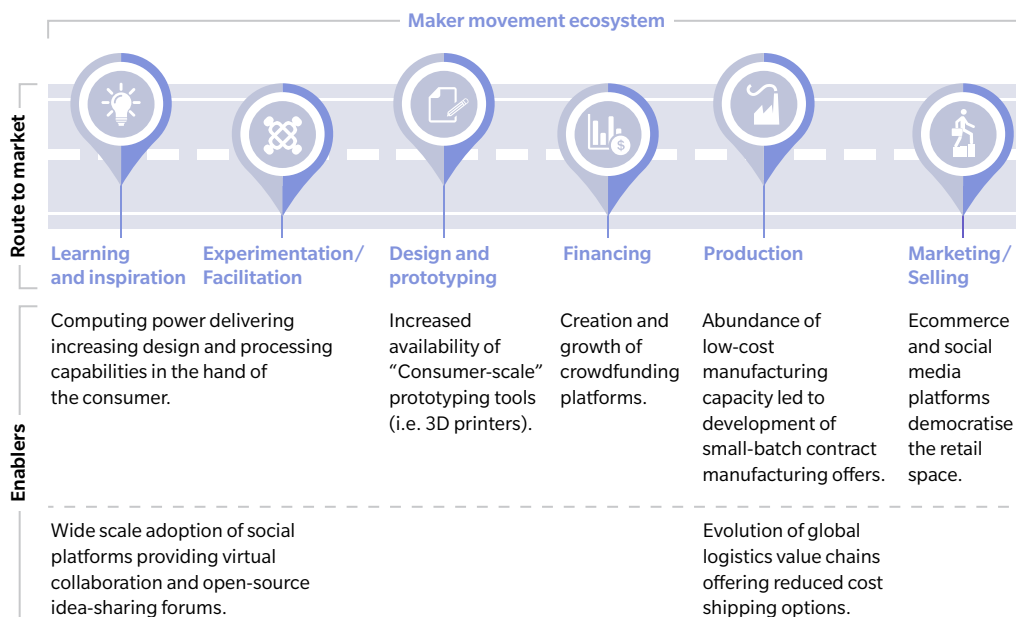







Exhibit 3: Rewriting the manufacturing rulebook

ENVISIONED IMPACT OF ENTREPRENEURSHIP

	CUSTOMIZATION	Customization demand to be met by Makers and respective platforms leading to niche consumerism
	LOWERED BARRIERS	Barriers to entry lowered with Maker platforms for funding, learning, tools and marketing
	SUPPLY-CHAIN SHIFT	Supply-chain flexibility to support shorter product life-cycles and faster product iterations
	INFRASTRUCTURE CHANGE	Physical retail infrastructure to evolve to support smaller businesses focused on niche demand
	RE/UP-CYCLING	With access to skills for Making, likelihood for recycling and reconfiguring finished products

The growth of entrepreneurship and effective contribution to the economy is expected to result in shifts across industries and respective value-chains

Source: Maker Media, Oliver Wyman analysis

THE FOURTH INDUSTRIAL REVOLUTION

The Maker Movement has already significantly impacted vast social and economic landscapes. Projected growth forecasts point to the movement's already substantial, but still escalating, importance to the global economy:

- The 3D printing market is projected to quadruple by 2025, to US\$12 billion¹
- In 2006, the San Francisco Maker Faire attracted 65,000 enthusiasts; 10 years later, there were 130,000 attendees, while in New York another 85,000 attended²
- Today, 1,100 hackerspaces around the world provide access to production tools once available only to corporate entities
- Peer-to-peer e-commerce is soaring, as evidenced in P2P site Etsy, whose revenue nearly quadrupled from 2011 to 2014, increasing from \$525 million in 2011 to US\$1.9 billion in 2014³
- Crowdfunding campaigns generated \$11.08 billion in 2014; that figure is projected to grow to \$93 billion by 2025⁴

The movement's direct impact, however, is only part of the equation. (See Exhibit 4) Still greater is its potential to catalyze GCC innovation in such key areas as manufacturing, education, community, and entrepreneurship.

MANUFACTURING The Maker Movement is inextricably linked to factors driving the fourth industrial revolution (4IR), promoting such trends as small-scale manufacturing and assembly, with manufacturing hubs closer to raw materials and/or end consumers.

EDUCATION The movement can influence existing education models to cultivate a culture of lifelong learning and experimentation with a shift towards "hands-on" learning, learning-by-doing, and innovative thinking. It can prepare the workforce for the industries of tomorrow.

COMMUNITY The movement promotes community values and engagement with civic institutions. By bringing together relevant institutions and enablers, it can catalyze local production and enterprise, thus enabling job growth and prosperity for the local economy.

ENTREPRENEURSHIP The Maker Movement is an expression of entrepreneurial spirit: The ecosystem proactively enables and promotes entrepreneurship by reducing barriers to entry throughout, and providing access to, the entire product value chain.

1. "3D Printing Market to Quadruple to \$12 Billion in 2025" [press release], Lux Research, April 29, 2014, <http://www.luxresearchinc.com/news-and-events/press-releases/read/3d-printing-market-quadruple-12-billion-2025>

2. "Maker Faire: A Bit of History," MakerFaire.com, accessed August 11, 2015, <http://makerfaire.com/makerfairehistory/>

3. Ruth Reader, "Etsy Starts Trading on the Nasdaq at \$31 per Share — Nearly Double Its Original Price," VentureBeat, April 16, 2015, <http://venturebeat.com/2015/04/16/etsy-starts-trading-on-the-nasdaq-at-31-per-share-nearly-double-its-original-price/>

4. Katie Kuehner-Hebert, "Crowdfunding Volumes Grow to \$16B", CFO.com, April 2, 2015, <http://ww2.cfo.com/credit-capital/2015/04/crowdfunding-volumes-grow-16b/>

Exhibit 4: A catalyst for innovation

ENVISIONED IMPACT OF THE MAKER MOVEMENT

MANUFACTURING	EDUCATION	COMMUNITY	ENTREPRENEURSHIP
Description			
Shift from centralized large-scale model to small-scale manufacturing and assembly, with manufacturing hubs closer to raw materials and/or end consumers	Influencing existing education models to cultivate a culture of lifelong learning and experimentation with a shift towards “hands-on” learning and innovative thinking	Revitalizing communities and promoting engagement with their civic institutions. Catalyzing local manufacturing and thus enabling job growth and prosperity for the local economy	The Maker ecosystem proactively enables and promotes entrepreneurship by reducing barriers to entry throughout, and providing access to, the entire product value chain
Impact			
Proponent for Fourth Industrial Revolution (4IR)	Readying future work-force for the industries of tomorrow	Bringing together relevant institutions and enablers	Promote entrepreneurship throughout the value-chain

AGENT OF TRANSFORMATION

The Maker Movement’s collaborative nature can promote a culture of close engagement with local communities and foster strong connections between citizens and governments. Instilling community pride through support of local enterprise has long been an aim of the GCC, one that the Maker Movement could help further. (See Exhibit 5)

Educational institutions are increasingly collaborating with the Maker Movement to support “learning-through-doing” and applied learning methodologies to engage students in new and constructive ways. In the US, for example, a collective of leading universities has committed to support the growth of the Maker Movement, while some, such as Arizona State University, are making connections through their own programs.

Exhibit 5: Driving civic engagement, collaboration, and local enterprise

ENVISIONED IMPACT ON GOVERNMENT AND PUBLIC POLICY



EXAMPLE OF GOVERNMENT ENGAGEMENT IN MAKING

- OAKLAND MAKERS**
“Oakland trained, sewn, built, grown”
- Publicly funded non-profit working group comprising makers, manufacturers, educators, and entrepreneurs
 - Example of public organization successfully bringing together relevant enablers to facilitate making
- | | |
|-------------------------------------|---------------------------|
| Museum – Ideation/showcasing | Oakland Museum of CA |
| Exhibitions | East Bay Mini Maker Faire |
| Workshops | Nimby/The Crucible |
| Education Institution | Laney College |

Governments are in a unique position to bring together the necessary enablers to realize the positive benefits of the Maker Movement

Source: Maker Media, Oakland Makers, Oliver Wyman analysis

LEVERAGING GCC RESOURCES TO CREATE VIABLE MAKER MOVEMENTS

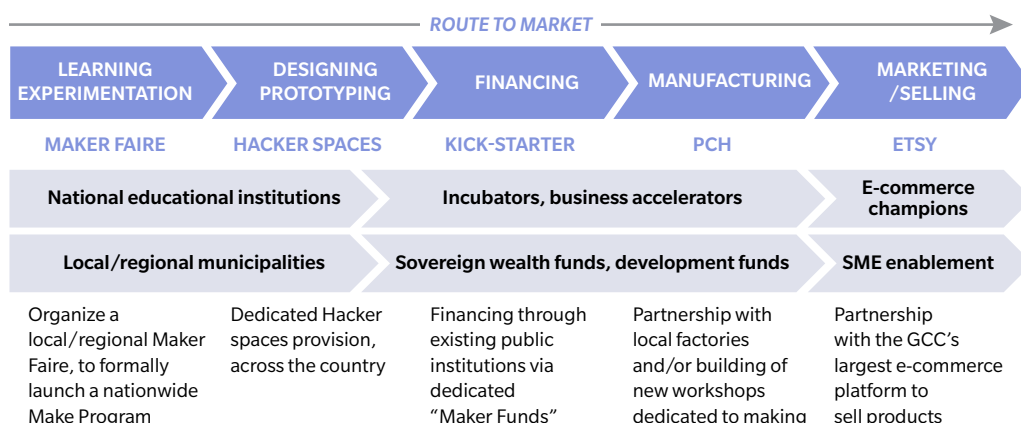
GCC nations have spent the past decade trying to diversify their economies, focusing on traditional/existing industries and exploitation of legacy resources, which has left them having to play catch-up with the more developed economies. But the GCC now has the opportunity to level the global playing field in sectoral development, promoting national infrastructure and human capital to compete with other global economies. To do so, however, they must aim to establish a pole position in future industrial sectors as part of the fourth industrial revolution.

GCC nations, like many across the globe, possess abundant potential in their youth populations, eager to adopt new technologies and strategies for learning. Given, however, the region’s relatively small national populations, factors that have typically spurred the development of educational initiatives in larger countries have not been observed.

But that dynamic can shift: Much of the governmental apparatus and market conditions needed to support the growth of the Maker Movement are already in place in GCC economies. A coordinated strategy by governments to “re-configure” traditional ecosystem enablers built in the industrial age could be effective in seeding and enabling the movement’s growth—and injecting new vitality into GCC economies, communities, and citizenry.

The Maker Movement can catalyze the creation of a productive workforce capable of tackling challenges and creating opportunities. To succeed in such an effort, however, GCC policymakers must shift their attentions further up the value chain, developing the capabilities to proactively shape the industries of tomorrow.

Exhibit 6: Maker Movement Ecosystem



Source: Oliver Wyman analysis

Oliver Wyman is a global leader in management consulting that combines deep industry knowledge with specialised expertise in strategy, operations, risk management, and organisation transformation.

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