IMMERSIVE SELF-CARE: A 2030 REALITY IN MIDDLE EAST?

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F R O S T & S U L L I V A N
The disease burden in the Gulf Cooperation Council (GCC) is skewed towards lifestyle diseases, driven by sedentary practices; obesity rates are very high, leading to diabetes and cardiovascular diseases (CVDs).

Not surprisingly, the disease burden is projected to increase significantly in the future as shown below.

To manage the ballooning impact on the population, healthcare-related spending in GCC is forecasted to reach approximately $110 billion by 2025.

**Share of Population with Diabetes, GCC, 2020 vs. 2030**

<table>
<thead>
<tr>
<th>Country</th>
<th>2020</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>UAE</td>
<td>16%</td>
<td>23%</td>
</tr>
<tr>
<td>KSA</td>
<td>19%</td>
<td>27%</td>
</tr>
<tr>
<td>Qatar</td>
<td>18%</td>
<td>22%</td>
</tr>
<tr>
<td>Bahrain</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td>Oman</td>
<td>11%</td>
<td>18%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>15%</td>
<td>23%</td>
</tr>
<tr>
<td>US</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>UK</td>
<td>6%</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Key:** NCDS - Non-communicable Diseases; CVD - Cardiovascular Diseases

Source: Frost & Sullivan
The old adage “prevention is always better than cure” has always been an aspiration for players in the GCC Healthcare ecosystem. The real way to realise the true potential of this adage – convergence of technologies and business models.

Frost & Sullivan believes the GCC as a region packs the desire and potential to drive this convergence of technologies and business models by 2030. **Immersive Self-Care (IS-C)** is one such convergence scenario that provides an extraordinary growth opportunity. IS-C will:

1. Leverage technologies such as behavioral digital biomarkers + precision molecular testing + immersive therapeutics to assess individual physical and mental health.
2. It will then, provide customised self-care recommendations to maintain and improve a user’s holistic well-being.
3. Composable infrastructure will help create modular biological data centers that improve the flexibility and efficiency of data access for processing clinical insights.
4. Auto-generative programs that leverage machine and deep learning algorithms to derive actionable wellness insights and recommendations will facilitate such large volumes of biological data.

**Source: Frost & Sullivan**
## ENABLING TECHNOLOGIES IN IMMERSIVE SELF-CARE

<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
<th>Benefits to Immersive Selfcare</th>
<th>Technology Readiness Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Molecular Testing</td>
<td>Precision molecular testing comprises a toolbox of screening tests and clinical diagnostics that can be used for health assessment, disease prevention, and therapy selection. It can be applied across the self-care continuum, including disease prevention, self-monitoring, and personalized self-management.</td>
<td>It enables accurate and real-time self-monitoring of <strong>physiological</strong> biomarkers using sensors, wearables, smartphone apps, and connected devices.</td>
<td>[1 2 3 4 5 6 7 8 9]</td>
</tr>
<tr>
<td>Behavioral Digital Biomarkers</td>
<td>Behavioral digital biomarkers refer to quantifiable measurements of human behavioral data such as physical activity, sleep patterns, eye movement, and voice samples obtained through digital technologies, such as smartphones, wearables, and internet-connected devices. The large volumes of collected data can be used to track patterns of different symptoms to better understand health and disease. Behavioral digital biomarker analysis can significantly improve preventive measures and personalized treatments.</td>
<td>It enables accurate and real-time self-monitoring of <strong>physical and behavioral</strong> biomarkers using sensors, wearables, smartphone apps, and connected devices.</td>
<td>[1 2 3 4 5 6 7 8 9]</td>
</tr>
<tr>
<td>Composable Infrastructure</td>
<td>Composable infrastructure is introducing modularity into an organization’s data centers. It facilitates flexibility and efficiency in the infrastructure according to organizational needs and objectives. This enables them to optimally use their infrastructure by disintegrating components from restricted silos.</td>
<td>It will help modularly organize biomarker data and will improve the flexibility and efficiency of data access.</td>
<td>[1 2 3 4 5 6 7 8 9]</td>
</tr>
<tr>
<td>Auto-Generative Program</td>
<td>It is a technology based on unsupervised and semi-supervised learning techniques that can create content such as text, software codes, images, audio, video, or any other type of creative content in response to the prompt input by identifying its abstract or underlying patterns. The content can be created based on machine learning/deep learning (ML/DL) algorithms to generate a creative, systemized, and optimized human-like output.</td>
<td>The technology will be able to process biomarker data to derive meaningful and actionable self-care insights using ML/DL algorithms.</td>
<td>[1 2 3 4 5 6 7 8 9]</td>
</tr>
</tbody>
</table>
### Immersive Therapeutics
- **Description:** Immersive therapeutics include the use of digital technologies such as augmented reality (AR), virtual reality (VR), and extended reality (ER) to develop virtual worlds that create an immersive therapy environment for patients to treat various diseases. The immersive environment improves user experience, treatment adherence, and clinical outcomes.
- **Benefits to Immersive Selfcare:** Immersive therapies can be leveraged for self-care practices to improve physical and mental wellbeing.

### Consolidated Security Architecture
- **Description:** Consolidated security architecture is the new comprehensive approach to cybersecurity challenges throughout an attack surface, be it across networks, mobile and fixed endpoints, multi-cloud environments, or various other devices. This brings more visibility and control to threat management with increased efficiency and cost-effectiveness.
- **Benefits:** This technology can be pivotal to protecting user biological data in multi-cloud environments and wearable devices.

## Key factors driving the Immersive Self-care scenario:

- **COVID-19 Pandemic:** The pandemic re-instated the need to focus on self-care to improve an individual’s holistic health, immunity, and well-being. Global healthcare providers have also encouraged self-care practices to reduce the global healthcare burden and enable proactive health monitoring. This can delay or prevent the onset of diseases, especially lifestyle disorders such as obesity and type 2 diabetes.

- **Rising Investments:** Precision molecular testing, an integral component of self-care, received around $5 billion in funding between 2021 and 2022. This will fuel the development, launch, and adoption of new self-monitoring and digital healthcare tracking platforms. It will also lead to the development of personalised health management initiatives through immersive self-care therapy platforms.

- **Rapid Advances in Immersive Technologies:** Technological advances in AR/VR and mixed reality (MR) platforms have enabled the development of an immersive user experience that can be harnessed for diverse self-care practices. Several companies are developing products and services that help users access these immersive platforms for self-managing pain, anxiety, insomnia, and isolation.
What’s accelerating IS-C are the on-going industry efforts around:

- Growing Healthcare-IT Collaborations
- Emerging Regulations
- Personalization of Innovations

For the GCC, the potential of IS-C can be realised through overcoming the following challenges:

1. **Bolstering Cross-Industry Collaborations:**
   - While there are growing healthcare IT collaborations and rapid advancements across immersive therapy platforms, there is a need to improve collaboration across self-tracking and immersive therapy technologies. There is also a rising need to integrate IT technology components pertaining to data storage, interpretation, insights, and data security.
   - All these collaborations should happen simultaneously to create a single-stop convergence scenario to actualise a holistic and immersive self-care experience for users.
   - After such collaborations, there will be a need to test the safety and efficacy of such platforms in real-world settings to establish clinical evidence and build reliable products and services that help provide an immersive self-care experience tailored to individual user needs. Start-ups striving to build simplified and energy-efficient chips/software that respond with human speed

2. **Drafting Robust Regulatory Guidelines:**
   - As self-care technologies rapidly emerge to improve wellness and self-management, there is a need to quickly develop robust and streamlined regulatory guidelines to ensure the safety and effectiveness of self-care services and products. Currently, there are a few regulatory guidelines that are not synchronised.
   - There is also a need to introduce national level policies that mandate self-care practices under defined circumstances to help prevent or delay diseases and encourage proactive self-care in the region.

**In summary, can Immersive Self-Care technology convergence scenario deliver impact, as a reality for the GCC, by 2030?**

**Yes, It’s Possible!**
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