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## A Framework for Innovation in Obesity.

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### ABSTRACT

The intersection of innovation and obesity presents a significant opportunity for businesses to address a pressing public health challenge while capitalizing on a growing market demand. This abstract explores the potential for businesses, both existing and new, to innovate within sectors such as food, healthcare, technology, and education to promote healthier lifestyles and combat obesity. With the obesity market estimated at \$80 billion annually, entrepreneurs, healthcare providers, and technology developers have ample room for growth and innovation. Existing businesses can reformulate products, offer new services, and advocate for supportive policies, while new ventures can enter the market with innovative solutions targeting obesity-related services and products.

Moreover, the DACMAR (Disrupt, Adopt, Collaborate, Manage, Adapt, and Resource) framework provides a structured approach for innovators to navigate the complexities of obesity management. Through the DACMAR framework, stakeholders can drive meaningful progress and innovation in addressing obesity. This framework emphasizes the importance of challenging the status quo, fostering partnerships, effective resource management, and dynamic adaptation to changing circumstances. Similarly, by applying the DACMAR framework's principles, investors can systematically rank different innovations in the obesity domain, ensuring market-readiness, identify go-to-market gaps and align investments with investors' strategic objectives. This enables objective de-risking to improve investment returns.

Furthermore, effective leadership is crucial in driving innovation and change, particularly in complex issues like obesity. Various leadership styles, including transformational, innovative, collaborative, servant, adaptive, and strategic, play essential roles in shaping the direction and impact of obesity prevention and treatment efforts. By leveraging diverse leadership approaches, stakeholders can work together to develop innovative solutions that improve outcomes for individuals and communities affected by obesity.

In conclusion, by integrating innovation and diverse leadership styles, businesses can play a vital role in addressing the global obesity epidemic, while also reaping financial rewards. However, it is imperative to recognize the challenges involved and to continuously refine strategies based on evidence and feedback to ensure effective obesity management and improved public health outcomes.

**Keywords:** obesity, innovation, leadership, business

## Introduction

Obesity, a global health epidemic characterized by excessive weight gain, afflicts a staggering number of individuals worldwide, as reported by the World Health Organization (WHO), with 650 million adults, 340 million adolescents, and 39 million children affected<sup>1</sup>. The prevalence of obesity in Western societies has surged since the industrial revolution, with its roots deeply entwined in the fabric of modernization and economic growth<sup>2</sup>. In recent years, this trend has extended to geographies like the Middle East, India, and China, manifesting as a significant public health concern<sup>3</sup>. However, as societies continue to progress, there exists the potential for a new modernity, one where obesity diminishes as human advancement accelerates. Central to this vision is the role of innovation, offering a pathway to address the complex challenge of obesity<sup>4</sup>.

Innovation, broadly defined “The introduction of something new,”<sup>5</sup> holds promise in combating obesity. By bringing novel solutions to the commercial marketplace, innovation can disrupt existing norms and catalyze positive change. This intentional approach to innovation distinguishes it from random ideas, allowing for purposeful advancements in societal well-being. In the context of obesity, intentional innovation can lead to sustainable solutions that promote healthier lifestyles and combat the obesity epidemic.

This manuscript explores the role of innovation in addressing the obesity epidemic. By examining how businesses can innovate within existing frameworks or establish new ventures, the manuscript aims to provide insights into leveraging innovation for healthier societies. Through a critical review of innovation theories and the introduction of the DACMAR (Disrupt, Adopt, Collaborate, Manage, Adapt, and Resource) framework, the manuscript offers practical guidance for real-world innovators in the obesity domain. Additionally, by discussing the importance of leadership in driving innovation and change, the manuscript highlights the essential role leaders play in shaping the future of obesity management. Overall, the purpose of this manuscript is to inform individuals and organizations about the transformative power of

innovation in combating obesity and promoting healthier lifestyles.

## Ethics and innovation in obesity

Ethical business practices are crucial in the realm of obesity innovation to ensure that advancements are made responsibly and with the well-being of individuals and communities in mind<sup>6</sup>. Given the sensitive nature of obesity as a public health issue, ethical considerations are paramount to avoid potential harm and to promote positive outcomes<sup>7</sup>.

Firstly, ethical business practices in obesity innovation help maintain trust and credibility with stakeholders, including consumers, healthcare professionals, and regulatory bodies<sup>7</sup>. Transparency in research, development, and marketing of obesity-related products and services is essential to build and maintain this trust<sup>8</sup>.

Secondly, ethical practices ensure that innovations are developed and implemented in a manner that respects human dignity and rights. This includes considerations for equitable access to innovative solutions, protection of vulnerable populations, and avoidance of exploitation<sup>8</sup>.

Thirdly, ethical practices contribute to the sustainability and long-term impact of obesity innovations<sup>6,9</sup>. By prioritizing ethical considerations, businesses can avoid short-sighted decisions that may have negative consequences in the future.

Overall, ethical business practices in obesity innovation are not only morally imperative but also essential for fostering a supportive and responsible environment for addressing this global health challenge.

## Obesity innovation and new business development

Overall, the obesity epidemic presents a wide range of new business opportunities for entrepreneurs, healthcare providers, technology developers, and other stakeholders interested in addressing this global public health challenge. The annual global obesity business market approximates \$80 billion/year (Table 1).

**Table 1.** Global obesity market by country <sup>10</sup>.

Country	Estimated Obesity Market Size (\$billions)
United States	68.2
China	6.4
India	1.3
Brazil	1.2
Mexico	1
Russia	0.9
Egypt	0.8
Indonesia	0.7
Germany	0.6
Pakistan	0.5
<b>TOTAL</b>	<b>81.6</b>

The obesity epidemic provides innovation and business opportunities in multiple sectors. First, there is a growing demand for healthcare services focused on obesity prevention, management, and treatment <sup>11</sup>. This includes medical weight loss clinics, bariatric surgery centers, obesity counseling services, and specialized clinics offering multidisciplinary care for obesity-related health conditions such as diabetes, hypertension, and sleep apnea <sup>12</sup>.

Second, with an increasing emphasis on physical activity as a key component of weight management, there are opportunities in the fitness and wellness industry <sup>13</sup>. Examples include gyms and fitness centers that offer tailored programs for individuals with obesity, personal training services, group exercise classes, and wellness retreats focused on weight loss and healthy living.

Third, the demand for nutritious food options and dietary supplements that support weight management is on the rise <sup>14</sup>. Businesses can capitalize on this by developing and marketing healthy food products, meal replacement shakes, nutritional supplements, and weight loss programs endorsed by healthcare professionals, celebrities or social media influencers <sup>15-17</sup>.

Fourth, technology can play an important role in obesity management, with opportunities in the development of mobile apps, wearable devices, and digital health platforms that track physical activity, monitor dietary habits, provide personalized coaching, and facilitate behavior change <sup>18</sup>. There is also a growing demand for telemedicine services, virtual support groups, and online communities focused on weight loss and lifestyle modification. In addition to consumer-facing technology solutions, there are opportunities in healthcare technology for electronic health records (EHR) systems <sup>19</sup>, population health management platforms, and predictive analytics

tools that help healthcare providers identify and intervene with individuals at risk for obesity-related health complications <sup>20,21</sup>.

Fifth, employers are increasingly recognizing the impact of obesity on employee health and productivity, creating opportunities for businesses that offer corporate wellness programs focused on weight management, healthy eating, stress reduction, and physical activity promotion <sup>22,23</sup>. These programs may include incentives, rewards, and gamification elements to engage employees and drive behavior change <sup>24</sup>.

Sixth and dominating the marketplace, the pharmaceutical and medical device industries offer opportunities for the development of obesity medications, appetite suppressants, and minimally invasive surgical procedures for weight loss <sup>25,26</sup>. Medicines alone accounted for \$2.4 billion in 2021 with a Compound Annual Growth Rate of >31% estimated through 2031 <sup>10</sup>. There is also potential for innovation in medical devices such as gastric bands, gastric balloons, and neuromodulation devices that help regulate appetite and metabolism <sup>25</sup>.

There is a need for continued research and development in the field of obesity, including studies on the effectiveness of different interventions, the underlying causes of obesity, and novel approaches to prevention and treatment. Businesses that specialize in weight management, obesity research, clinical trials, and scientific consulting can capitalize on this demand for evidence-based solutions.

### **Obesity innovation in pre-existing enterprises**

Whilst new businesses are often innovative; not all innovation necessitates new businesses. Pre-existing businesses can innovate within their product ranges and using in-house skill sets <sup>27</sup>.

The food industry can profit through the development and promotion of healthier food and beverage options <sup>14</sup>. This could involve reformulating existing products to reduce sugar, fat, and calorie content, as well as introducing new products that are lower in unhealthy ingredients and higher in beneficial nutrients. Innovation in food technology can also lead to the creation of alternative ingredients and processing methods that improve the nutritional profile of foods without sacrificing taste or convenience <sup>28</sup>. All these innovations made by pre-existing manufactures are potentially profitable. By their introduction, healthier options displace unhealthy products from supermarket shelves and therefore directly promote health.

Businesses can leverage pre-existing technology to develop innovative solutions that promote physical activity, monitor dietary habits, and support behavior change <sup>29</sup>, for example the use of electronic watches to track health variables linked to online platforms that provide personalized coaching, tracking, and feedback to help individuals manage their weight more effectively <sup>30</sup>.

Businesses in the healthcare sector can innovate by offering new and improved services for obesity prevention, diagnosis, and treatment <sup>12,31</sup>. This could involve the development of evidence-based telemedicine programs, digital health interventions, and multidisciplinary care models that provide comprehensive support to individuals struggling with obesity. Innovations in healthcare delivery can also improve access to obesity treatment for underserved populations and reduce disparities in care. By replacing less useful interventions for those with higher efficacy, people get better help without additional healthcare expenditure.

Businesses can innovate in education and awareness by developing creative and engaging campaigns that promote healthy eating, physical activity, and weight management <sup>32</sup>. This could include partnering with schools, workplaces, and community organizations to deliver evidence-based nutrition and exercise programs, as well as using social media and digital marketing to reach broader audiences with targeted messaging such as reducing obesity-associated stigma <sup>33</sup>. Argue, that

such measures promote pre-existing businesses, and thereby result is greater distribution and greater fiscal return.

Sustainability in the context of obesity business development could involve promoting sustainable lifestyle changes, environmentally friendly food production methods, or creating sustainable business models that support long-term health and wellness initiatives <sup>34</sup>. A business that promotes sustainable longer-term benefit has greater 'stickiness' <sup>35</sup>, less consumer attrition and greater sustained revenue streams. Obesity is a long-term challenge for people; businesses financially benefit by supporting the longevity of the challenge.

Understanding consumer behavior is essential for developing innovative solutions to address obesity, such as designing products and services that align with consumer preferences, habits, and motivations for making healthier choices <sup>36</sup>. It is cheaper to tweak a pre-existing business based on detailed consumer information that starting a new one. Similarly, effective marketing and branding strategies can play a crucial role in promoting pre-existing obesity solutions, in an innovative as for instance by raising awareness, changing perceptions, and encouraging adoption of healthier behaviors and products <sup>27</sup>.

Businesses can innovate by advocating for policies and regulations that support obesity prevention and treatment efforts <sup>37</sup>. This could involve supporting initiatives to improve food labeling, restrict marketing of unhealthy foods to children, and increase access to affordable healthy foods in underserved communities. Businesses can also play a role in shaping workplace wellness programs and corporate social responsibility initiatives that prioritize employee health and well-being. Healthy workplace cultures attract talent, are productive and data suggest, more profitable. Regardless, a mutually serving equation can exist between healthful policies and products.

In conclusion, the nexus of innovation and obesity offers businesses a pivotal opportunity to address the global health crisis. They are summarized in Table 2.

**Table 2.** Innovation opportunities in obesity, comparing the roles for new and pre-existing offerings.

Aspect	New Businesses	Pre-existing Businesses
<b>Innovation Potential</b>	<ul style="list-style-type: none"> <li>- Healthcare services focused on obesity prevention, management, and treatment.</li> <li>- Fitness and wellness programs tailored for individuals with obesity.</li> <li>- Development of healthy food products and dietary supplements.</li> <li>- Technology solutions for health tracking and behavior change.</li> <li>- Corporate wellness programs for employee health and productivity.</li> <li>- Pharmaceuticals and medical devices for weight management.</li> <li>- Research and development services in obesity studies and clinical trials.</li> </ul>	<ul style="list-style-type: none"> <li>- Innovation within product ranges and using in-house skill sets.</li> <li>- Reformulating existing products for healthier options.</li> <li>- Developing alternative ingredients and processing methods.</li> <li>- Leveraging technology for health tracking and behavior change.</li> <li>- Offering new and improved healthcare services.</li> </ul>
<b>Market Opportunities</b>	<ul style="list-style-type: none"> <li>- Growing demand for healthcare services, fitness programs, healthy food options, and technology solutions related to obesity management.</li> <li>- Potential for profitable returns in pharmaceuticals, medical devices, and research and development.</li> </ul>	<ul style="list-style-type: none"> <li>- Wide range of business opportunities in addressing the obesity epidemic.</li> <li>- Approximate annual global obesity business market of \$80 billion/year.</li> </ul>
<b>Sustainability and Longevity</b>	<ul style="list-style-type: none"> <li>- Innovation in medical devices for long-term weight management.</li> <li>- Research and development for evidence-based obesity solutions.</li> <li>- Leveraging technology for sustainable behavior change.</li> </ul>	<ul style="list-style-type: none"> <li>- Sustainable lifestyle changes and environmentally friendly food production methods.</li> <li>- Business models supporting long-term health initiatives.</li> <li>- Understanding consumer behavior for effective solutions.</li> </ul>
<b>Business Growth and Profitability</b>	<ul style="list-style-type: none"> <li>- Profitable returns in healthcare services, pharmaceuticals, and technology solutions.</li> <li>- Engagement and behavior change through incentives and gamification.</li> <li>- Potential for high growth in pharmaceuticals and medical devices.</li> <li>- Research-driven business models for evidence-based solutions.</li> </ul>	<ul style="list-style-type: none"> <li>- Greater distribution and fiscal return through promotion of healthier options.</li> <li>- Utilizing detailed consumer information for cost-effective innovation.</li> <li>- Effective marketing strategies for promoting healthy behaviors.</li> </ul>
<b>Role in Addressing Obesity Epidemic</b>	<ul style="list-style-type: none"> <li>- Providing effective obesity prevention, management, and treatment solutions.</li> <li>- Improving employee health and productivity through corporate wellness programs.</li> <li>- Contributing to evidence-based research and development in obesity studies.</li> </ul>	<ul style="list-style-type: none"> <li>- Empowering individuals to make healthier choices and lead healthier lives.</li> <li>- Reducing burden of obesity on individuals, communities, and healthcare systems.</li> </ul>
<b>Integration with Innovation Theory</b>	<ul style="list-style-type: none"> <li>- Applying innovation theory to guide efficient and effective development of new obesity solutions.</li> <li>- Incorporating innovation in research and development for evidence-based approaches.</li> <li>- Strategic partnerships for impactful innovation.</li> </ul>	<ul style="list-style-type: none"> <li>- Leveraging latest advancements in technology and healthcare for positive change.</li> <li>- Stakeholder amalgamation for driving innovation.</li> <li>- Strategic use of innovation theory for efficiency and profitability.</li> </ul>

New ventures focusing on obesity-related services meet the demand for innovative approaches. With the obesity market valued at \$80 billion annually, entrepreneurs can innovate within existing sectors, like food and healthcare, by reformulating products and leveraging technology for prevention and treatment. Collaboration across sectors fosters partnerships toward effective solutions. Businesses, through creativity and collaboration, can significantly contribute to mitigating one of the most critical public health challenges of our time. How might best practices in innovation guide innovation and business development in the obesity sector?

### Theories of innovation

People tend to rationalize complex and disruptive processes to better understand how to harness the innate desire to innovate<sup>38,39</sup> and to critically

evaluate failure versus success<sup>40,41</sup>. Innovation theories fabricate conceptual frameworks and a common lexicon to guide interdisciplinary research and collaboration<sup>42,43</sup>. Governments, organizations, and businesses apply innovation

theories to inform policy and strategic planning of the global innovation obesity ecosystem <sup>44,45</sup>. The spectrum of innovation ranges from radical to incremental <sup>46,47</sup>. Radical innovations introduce groundbreaking shifts, often disrupting existing norms, while incremental innovations involve gradual improvements. Recognizing these

distinctions helps appreciate the change processes. Not all change is innovation, as some changes are insignificant adjustments. Conversely, innovations are change <sup>48</sup>. Many theories of innovation and change have been described <sup>49</sup> and several are shown in Table 3.

**Table 3.** Description and examples of theories of innovation <sup>39,51,53-55,57-67</sup>.

Theory	Central thesis	Example
<b>Schumpeter's Theory of Innovation</b> <sup>50,51</sup>	Entrepreneurs are the focal point of innovation; they disrupt existing markets by means of developing new products, services, or processes.	Transformation of the transportation industry through ridesharing aligns with Schumpeter's vision of innovation as a dynamic and disruptive force that propels economic development.
<b>Diffusion of Innovation Theory</b> <sup>52,53</sup>	Innovations spread or diffuse through society. Adoption is enhanced via communication channels, societal structures, and adopter groups.	Smartphone diffusion aligns with principles of the Diffusion of Innovation Theory, showcasing how innovation spreads through sectors of society.
<b>Open Innovation Theory</b> <sup>54</sup>	Innovation is driven by external and internal drivers. Innovation from diverse sources is advanced by different ideas and collaboration.	The Tesla-Panasonic collaboration in the development of electric vehicle batteries illustrates how the Open Innovation Theory can lead to successful outcomes by leveraging external expertise, sharing knowledge, and fostering collaborative efforts.
<b>Lewin's Change Management Model</b> <sup>55,56</sup>	Innovation occurs via a freeze-thaw-freeze cycle: (a) unfreeze the status quo, (b) make change, (c) refreeze to solidify the change.	Microsoft's transformation from 2014 onwards demonstrates how structured change can drive innovation and organizational success. Nadella took over as CEO in 2014 and initiated a cultural shift and organizational change at Microsoft, using Lewin's three-stage model.
<b>Kotter's 8-Step Change Model</b> <sup>57</sup>	Innovation occurs via 1: Generate urgency. 2: Build coalitions. 3: Develop and elucidate vision. 4: Communicate the change. 5: Empower actions and remove obstacles. 6: Show short-term gains. 7: Consolidate and define strategic progress. 8: Anchor impacts.	The successful transformation of IBM in the 1990's demonstrates how Kotter's 8-Step Change Model can be applied to drive innovation and reshape a company's strategy in response to industry challenges.
<b>Dynamic Capabilities Theory (DCT)</b> <sup>58</sup>	Focused on the dynamic commercial environment and the need for speedy responses. DCT focuses on a firm's fluidity to redesign internal and external competencies.	The application of Dynamic Capabilities Theory in Apple's innovation path with the iPhone showcases how the company effectively sensed and responded to changes in the environment, reconfigured resources, learned and adapted over time, demonstrated flexibility, and continuously innovated its business models.
<b>Complexity Theory</b> <sup>59</sup>	Systems being innovated are complex, and responsive. Change is similarly complex, multifocal, and multilinear.	The application of the Complexity Theory in Google's search algorithm particularly with respect to the introduction of PageRank, highlights how embracing the complexity of the web environment led to the development of an innovative and adaptive system.
<b>Resource-Based View (RBV)</b> <sup>60,61</sup>	Innovations stems for an organization's resources and capabilities. The infrastructures drive competitive advantage and innovation capacity.	Amazon's development and implementation of its cloud computing service, Amazon Web Services (AWS) exemplifies application of the Resource-Based View.
<b>Disruptive Innovation</b> <sup>39,62</sup>	Innovation occurs via displacement of established market forces. Innovations create value and new markets by identifying the "job-to-be-done."	Netflix illustrates how disruptive innovation can occur by addressing the pain points of non-consumers, introducing innovative business models, and continuously evolving to meet changing consumer preferences.

## Common themes amongst theories of innovation and change

Theories of innovation and change share several themes in common.

**Innovation and disruption:** Innovation is disruptive. Schumpeter's Theory and Disruptive Innovation highlight the pivotal role of disruptive forces in driving change and creating new market paradigms<sup>50,62</sup>. Importantly, there exists a spectrum in the level of disturbance or interruption which indicates varying degrees of impact or interference, reflecting a range of disruption. Regardless, a key aspect of innovation is the delivery of something new to the market. Consequently, there is a growing emphasis on data-driven competitive market analysis to objectively verify the degree of disruptiveness<sup>68,69</sup> against predictive models<sup>70</sup>, that nowadays can apply Artificial Intelligence algorithms<sup>71</sup>.

**Adoption and Diffusion:** Will anyone use an innovation and if so, how will they access it? Diffusion theory emphasizes the importance of understanding how innovations spread through social systems and how adopters interact with them. Having a disruptive innovation without knowledge of how to access its market is predictive of failure<sup>72,73</sup>. The utility of an innovation may be demonstrated through experimentation; however, building access can be more challenging. For example, access is a key issue in health innovation whereby inequity explains why underserved populations frequently cannot access critical new therapies<sup>74</sup>.

**Collaboration and Openness:** Open Innovation underscores the significance of collaborative ecosystems and external inputs in fostering innovation<sup>75</sup>. Innovation can be disruptive and well-strategized but may fail in the absence of key stakeholders. For example, an innovative gene therapy might complete successful clinical trials but without collaboration with patient associations, the therapy will neither receive regulatory approval nor reach the targeted patient population<sup>76</sup>.

**Change Management:** Lewin's and Kotter's models emphasize systematic change management<sup>57</sup>. Lewin's model is often denoted as a three-stage process (Unfreeze, Change, Refreeze)<sup>56</sup>, while Kotter's model<sup>77</sup> comprises eight steps. An innovative enterprise without pre-planned change management risks failure<sup>78</sup>.

**Dynamic Adaptation:** Dynamic Capabilities Theory<sup>58</sup> underscores an organization's need to speedily pivot, up-skill, and adapt. As Teece summarizes,

"... to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments."<sup>79</sup>.

Complexity Theory<sup>59</sup> views organizations as complex adaptive systems, emphasizing adaptability to unpredictable environments. Adaptability, continuous learning<sup>80</sup>, and pivot<sup>81</sup> underscore the need for dynamic responsiveness. Marketplaces are dynamic; innovation must be too.

**Resource Utilization:** The Resource-Based View (RSV)<sup>82</sup> emphasizes that successful innovation depends on the effective allocation of resources and capabilities. RSV highlights the integral role of resource allocation in transforming innovative ideas into sustainable advantages, emphasizing the need for entrepreneurs to strategically manage, leverage, and acquire critical resources for long-term success.

## Differences between theories of innovation

It is accepted that similarities exist between different theories of innovation and change. However, there are differences that offer, at times, divergent perspectives. Lewin's Change Management model<sup>55</sup> describes a structured, three-stage process, advocating for a linear approach to change. In contrast, the Complexity Theory<sup>59</sup> challenges this linearity, asserting that change can take unpredictable, nonlinear paths within complex organizational systems.

Schumpeter's Theory of Innovation<sup>50</sup> highlights the role of entrepreneurial disruption as a catalyst for economic progress, and Disruptive Innovation Theory<sup>62</sup> spotlights market disruption caused by new entrants. This perspective contrasts with other theories that may not prioritize disruptive change as a primary force. For example, the Diffusion of Innovation Theory<sup>52</sup> explores the gradual dissemination of innovations through distinct stages, portraying a more incremental and systematic view. The Open Innovation Theory<sup>54</sup> champions collaboration and external input for innovation, while the Resource-Based View<sup>83</sup> posits that internal resources are key drivers of innovation. These varying perspectives on the source of innovation reflect differing philosophies regarding the locus of creative impetus.

In the field of innovation & change, Kotter's 8-Step Change Model<sup>77</sup> provides a sequential framework, emphasizing a structured leadership approach, simplified by Lewin's approach<sup>56</sup> to the same issue. In contrast, Dynamic Capabilities Theory underscores the need for adaptability and

continuous learning, offering a more organic approach to leading change.

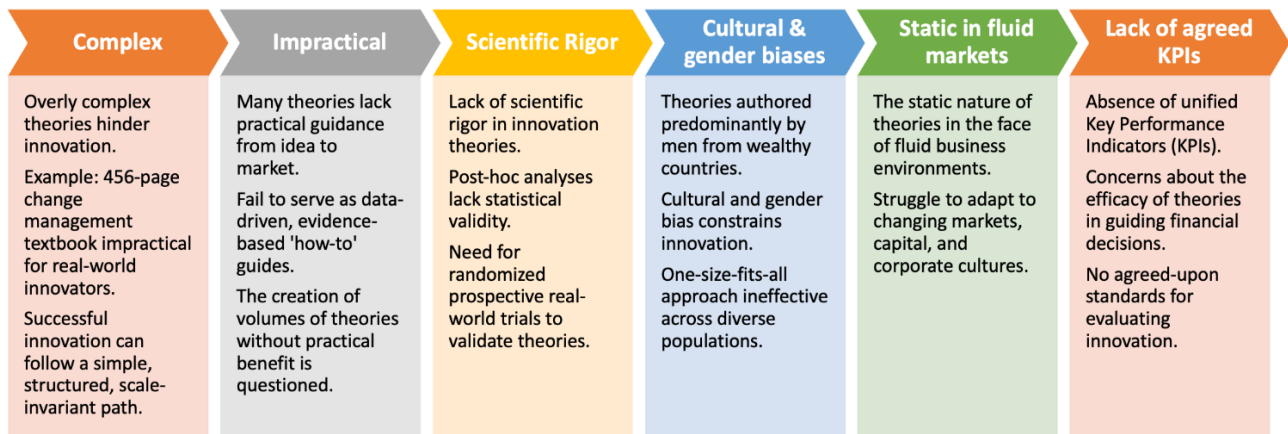
These differences underscore the complexity, diverse and multifaceted nature of innovation and change. It is important to consider these differences when navigating transformative processes.

### A critical review of innovation theories

Despite the importance of the theoretical frameworks described above, a critical analysis

reveals limitations to theories of innovation and change (Figure 1).

First, the fact that multiple theories exist to contextualize innovation and change suggests the absence of a consistent, proven, prescriptive model for innovation and change design.



**Figure 1:** Limitations to theories of innovation.

A second limitation lies in the complexity of the theories <sup>70</sup>. Unnecessarily complex theories can hinder innovation; for example, a 456-page, 29-chapter textbook of change management <sup>49</sup> is unlikely to be used by real-work innovators or entrepreneurs. Innovation does not necessarily need to be so complex; for instance, evidence from 156 biotech start-ups illustrates that successful innovation can follow a simple, structured, “scale-invariant” <sup>70</sup> innovation path <sup>84</sup>.

Complexity begets impracticality. Many innovation theories lack idea-to-market practical guidance, failing to serve as data-driven, evidence-based 'how-to' guides to help innovators succeed <sup>85</sup>. The utility of creating volumes of theories that do not benefit their intended audiences could be questioned.

Theories of innovation and change lack scientific rigor <sup>86</sup>. The post-hoc nature of theories that retrospectively analyze cases, lacks statistical validity <sup>87</sup>. Unlike prospective testing required by the Koch postulate <sup>88</sup>, post-hoc analyses can only generate hypotheses but not confirm them. The absence of rigorous prospective studies renders models of innovation and change unproven <sup>89</sup>. Innovation initiatives could be randomized into prospective real-world trials, as occurs in agriculture <sup>90</sup>, so that objective outcomes could be statistically compared to determine which

innovation theory performs best <sup>89</sup>. Theories of innovation and change are not immune from rigorous science and might benefit from it.

Cultural and gender bias <sup>91-93</sup> constrains innovation and change theories. Most theories are authored by men from wealthy countries. This propagates biases faced by women and innovators from underrepresented racial and socioeconomic populations <sup>94</sup>. The application of a one-size-fits-all approach across multiple business domains, cultures, and diverse populations is ineffective, as different contexts and psychologies demand tailored strategies of varying complexity <sup>43,70,95</sup>.

Another limitation is that innovation/change theories are static in the face of fluid business environments. Markets and capital are fluid and corporate cultures change; innovation theories struggle to adapt <sup>85</sup>.

Lastly, innovation and change theories lack unified Key Performance Indicators (KPIs)<sup>96</sup>. Despite substantial investments in innovation, the lack of accepted success or failure standards and pre-defined return on investment matrices raises concerns about the efficacy of these theories in guiding financial decisions. Whilst Innovation Performance Mapping is conceptually attractive <sup>27</sup>, there are no validated and agreed-upon trans-cultural, international, or cross-industry standards for evaluating innovation <sup>97,98</sup>.



These overarching critiques can be applied to each theory of innovation and change in turn (Table 4).

While some theories perform better than others, none are optimal.

**Table 4.** A critique of theories of innovation and change categorized by simplicity, consistency, scientific rigor, cultural diversity, practical guidance, adaptability to diverse contexts, and established Key Performance Indicators (KPI's).

Theory	Strengths	Weaknesses
<b>Schumpeter's Theory of Innovation</b> 50,75	<ul style="list-style-type: none"> <li>- Importance of entrepreneurship and creative destruction in driving economic growth.</li> <li>- Highlights the role of innovation in disrupting existing markets and creating new ones.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of practical implementation guidance.</li> <li>- Limited consideration of cultural diversity &amp; gender biases.</li> <li>- Static nature may not address fluid business environments.</li> <li>- No unified success/failure standards.</li> </ul>
<b>Diffusion of Innovation Theory</b> 53	<ul style="list-style-type: none"> <li>- Provides insights into how innovations spread within a population or market.</li> <li>- Framework for understanding the adoption process by different groups.</li> </ul>	<ul style="list-style-type: none"> <li>- Limited focus on initial stages of innovation.</li> <li>- May overlook cultural diversity and gender biases.</li> <li>- Lack of guidance on initiation and accelerated diffusion.</li> <li>- Static nature.</li> <li>- No unified success/failure standards.</li> </ul>
<b>Open Innovation Theory</b> 54	<ul style="list-style-type: none"> <li>- Emphasizes the importance of collaboration and knowledge-sharing with external partners.</li> <li>- Recognizes the value of using external concepts and technologies to improve innovation.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks clarity how best to practically impact innovation.</li> <li>- Limited consideration of cultural diversity and gender biases in collaboration efforts.</li> <li>- Static nature may not adequately address changes in external partnership dynamics.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>
<b>Lewin's Change Management Model</b> 55,56	<ul style="list-style-type: none"> <li>- Provides methodology to understand &amp; manage organizational change.</li> <li>- Highlights the value of "unfreezing" prevailing behavior, making change, and "refreezing" new behavior.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks consideration for innovation creation.</li> <li>- May not address cultural diversity and gender biases.</li> <li>- Static nature may not adapt well to rapidly changing business environments.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>
<b>Kotter's 8-Step Change Model</b> 57	<ul style="list-style-type: none"> <li>- Methodical framework for managing organizational change.</li> <li>- Emphasizes a need for a sense of urgency, building collaborations &amp; coalitions, and sustaining change.</li> </ul>	<ul style="list-style-type: none"> <li>- Limited focus on innovation creation processes.</li> <li>- May not adequately address cultural diversity and gender biases in change management efforts.</li> <li>- Static nature not adapted to changing environments.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>
<b>Dynamic Capabilities Theory (DCT)</b> 58	<ul style="list-style-type: none"> <li>- Highlights organizational adaption and reconfiguration to respond to changing business environments.</li> <li>- Emphasizes learning, knowledge creation, and innovation as drivers of organizational success.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks practical guidance leveraging dynamic capabilities.</li> <li>- Limited consideration of cultural diversity &amp; gender biases.</li> <li>- Static nature does not address rapid changes in business environments.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>
<b>Complexity Theory</b> 59	<ul style="list-style-type: none"> <li>- Offers insights into the behavior of complex systems and emergent phenomena.</li> <li>- Acknowledges the nonlinear and unpredictable nature of change.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks practical applications for guiding innovation.</li> <li>- Limited consideration of cultural diversity and gender biases.</li> <li>- Complexity hinders implementation in real-world.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>
<b>Resource-Based View (RBV)</b> 60,61	<ul style="list-style-type: none"> <li>- Highlights the application of core resources &amp; competencies in drive competitive advantage.</li> <li>- Emphasizes the role of resource heterogeneity and immobility in sustaining competitive positions.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks practical guidance on developing and leveraging internal resources for innovation and change.</li> <li>- Limited consideration of cultural diversity and gender biases in resource allocation processes.</li> <li>- Static nature may not adapt to changing environments.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>

Theory	Strengths	Weaknesses
<b>Disruptive Innovation</b> 39,62	<ul style="list-style-type: none"> <li>- Recognizes the potential for small, disruptive innovations to challenge incumbency and reshape industries.</li> <li>- Emphasizes importance of targeting underserved markets or low-end customers.</li> </ul>	<ul style="list-style-type: none"> <li>- Lacks guidance on effectively identifying and capitalizing on disruptive opportunities.</li> <li>- Limited consideration of cultural diversity &amp; gender biases.</li> <li>- Static nature may not address market dynamics.</li> <li>- Absence of unified KPIs to measure success or failure.</li> </ul>

### Does innovation theory hinder creativity?

On one hand, common themes among innovation and change theories underscore the role of creativity in disruptive innovation, adoption and diffusion, collaboration, change management, dynamic adaptation, and resource utilization. Creativity enables organizations to navigate dynamic environments, pivot swiftly, and effectively allocate resources to drive sustainable innovation. As Gilmartin suggests, Creativity is, “the fuel of innovation,”<sup>99</sup>.

Innovators view the interspace between creativity and innovation differently. For example, DeBono suggested, “Creativity involves breaking out of established patterns in order to look at things in a different way,”<sup>100</sup> whereas Jobs reduced the concept; “Creativity is just connecting things,”<sup>101</sup>. The concern, however, is that theoretical frameworks of Innovation and Change Theories give rise to barriers limiting the impact of creativity. Sawyer argues contrarily that rule-based frameworks guide even classical art forms such as dance (e.g., ballet positions), music (e.g., scales) and painting (e.g., perspective)<sup>9</sup>. Well-structured frameworks in innovation, should not necessarily inhibit creativity.

On balance, some concern is justified; the critical review of innovation and change theories reveals limitations that may hinder the full potential of creativity. Complex and static theories, lacking scientific rigor and cultural diversity, pose

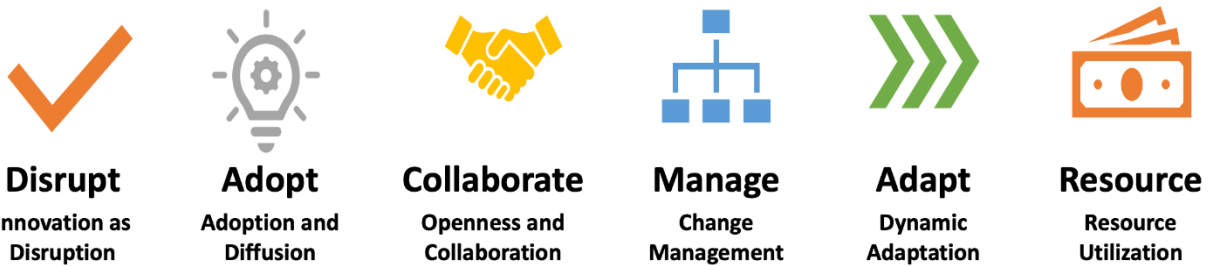
challenges to fostering data-driven creativity and innovation across diverse contexts. Moreover, the absence of unified Key Performance Indicators (KPIs) and the paucity of evidence-drivers, inhibit the effective measurement of creative outputs and their impact on organizational success<sup>102,103</sup>.

While creativity serves as a cornerstone of innovation and change, overcoming the limitations of existing theoretical frameworks is essential to fostering adaptive, culturally sensitive, and practically useful models that facilitate creativity and innovation in diverse contexts.

Overall, the critique of innovation and change theories highlights their lack of simplicity, consistency, scientific rigor, cultural diversity, practical guidance, adaptability to diverse contexts, and established Key Performance Indicators. Moreover, creativity can be stifled. The need exists for more adaptable, culturally sensitive, data-driven, and practically useful models with clear performance metrics to advance innovation in obesity. The DACMAR framework aims to achieve this.

#### A PRACTICAL CHECKLIST FOR REAL-WORLD INNOVATION

Using a reductionist approach akin to Soto’s “organicism”<sup>104</sup>, six core principles of innovation and change can be delineated called the DACMAR framework (Disrupt, Adopt, Collaborate, Manage, Adapt, Resource) (Figure 2).



**Figure 1:** The DACMAR framework (Disrupt, Adopt, Collaborate, Manage, Adapt, Resource); a simple, actionable innovation checklist based on the synthesis of innovation and change theories.

The DACMAR framework provides a comprehensive and structured approach to innovation and change in the obesity domain. It serves as a cohesive set of

operational guidelines, offering an actionable checklist for both seasoned professionals and less experienced innovators and change agents alike.

By employing the DACMAR framework, innovators in obesity can systematically navigate the complexities of innovation and change, ensuring alignment with strategic objectives and maximizing the likelihood of positive outcomes in diverse contexts.

The first principle, *Disrupt*, encourages innovators to challenge the status quo and identify opportunities for transformative change. *Adopt* prompts the consideration of existing solutions and their potential for integration or adaptation. *Collaborate* emphasizes the importance of partnerships and collective action in driving innovation forward.

*Manage* focuses on effective leadership and strategic planning to oversee the implementation of innovation initiatives. *Adapt* underscores the necessity of flexibility, pivot, and responsiveness to evolving circumstances. Lastly, *Resource* highlights the critical role of resource allocation and management in supporting innovation efforts.

To render the DACMAR framework useful to real-world innovators, each of the six DACMAR principles incorporates a question (ASK), an action (DO), and an outcome measure (MEASURE) (Figure 3).



	Disrupt	Adopt	Collaborate	Manage	Adapt	Resource
ASK	Innovation disruptive?	Who will use?	Key partnerships in place?	Leadership & management strategy?	Plan to adapt and pivot?	Resources in place to execute?
DO	Competitive analysis	Design plan for access	Stakeholder matrix	Timelines and deliverables	Market track: accelerators, levers & breaks	Resource map: financial controls
MEASURE	Market readiness	Adoption determinants	Engagement	Adherence to timelines	Market-vs-response	Resources tracking matrix

**Figure 2.** Practical application of the DACMAR framework (Disrupt, Adopt, Collaborate, Manage, Adapt, Resource); Each of the six principles includes a question (ASK), action (DO) and outcome measure (MEASURE).

The DACMAR framework is a cohesive set of operational guidelines, offering an actionable checklist for less experienced innovators and change agents in obesity. By employing the DACMAR framework, innovators can navigate innovation and change systematically, to help foster positive weight outcomes in varying contexts. Amplification of each element of the DACMAR framework follows.

**DISRUPTION:**

In obesity business development, innovation and disruption are pivotal. Disruptive innovation, (Schumpeter, 1961, Christensen, 2008), transforms market dynamics. Novel approaches like personalized nutrition plans or wearable health monitors challenge traditional methods, potentially creating new markets. The ASK, DO and MEASURE tasks will be reviewed:

1. ASK: Determine the innovation's disruptiveness by assessing its impact on weight management norms. For instance, personalized nutrition plans tailored to

genetic data or wearable health monitors offer personalized insights, challenging traditional strategies. Whilst non-traditional disruptions in weight management seem attractive, the important of highest ethics is mandatory to support a sustainable obesity innovation ecosystem.

2. DO: Conduct competitive market analysis to understand the landscape of obesity management solutions. For example, analyze SWOT factors <sup>105,106</sup>; identify competitors, and explore regulatory and intellectual property considerations for strategic positioning.
3. MEASURE: Assess market readiness by evaluating customer and stakeholder willingness to adopt the innovation. Consider awareness, regulatory environment, and technological infrastructure. Conduct market research and real-world pilot studies to gauge interest and address barriers for successful implementation.

**ADOPTION:**

For successful innovations in obesity business development, understanding adoption and diffusion dynamics is crucial <sup>97</sup>. This entails not only developing innovative solutions but also ensuring their accessibility and appeal to target populations, including underserved communities.

1. ASK: Identifying target users, such as individuals with obesity, healthcare providers, and policymakers, is vital for designing effective interventions. Considering demographics, socio-economic status, and cultural backgrounds helps tailor solutions to meet diverse needs.
2. DO: Developing a comprehensive plan for market access involves strategies to efficiently reach intended users. This includes optimizing distribution channels, pricing models, and partnerships with key stakeholders to ensure broad adoption and integration into existing healthcare systems.
3. MEASURE: Measuring determinants for adoption involves assessing factors influencing individuals' willingness and ability to adopt innovative solutions. This includes understanding individual and contextual factors through surveys, interviews, and evaluation of external influences like policy changes and technological advancements. Tailored strategies can then be developed to promote uptake and sustainability within the target population.

**COLLABORATION:**

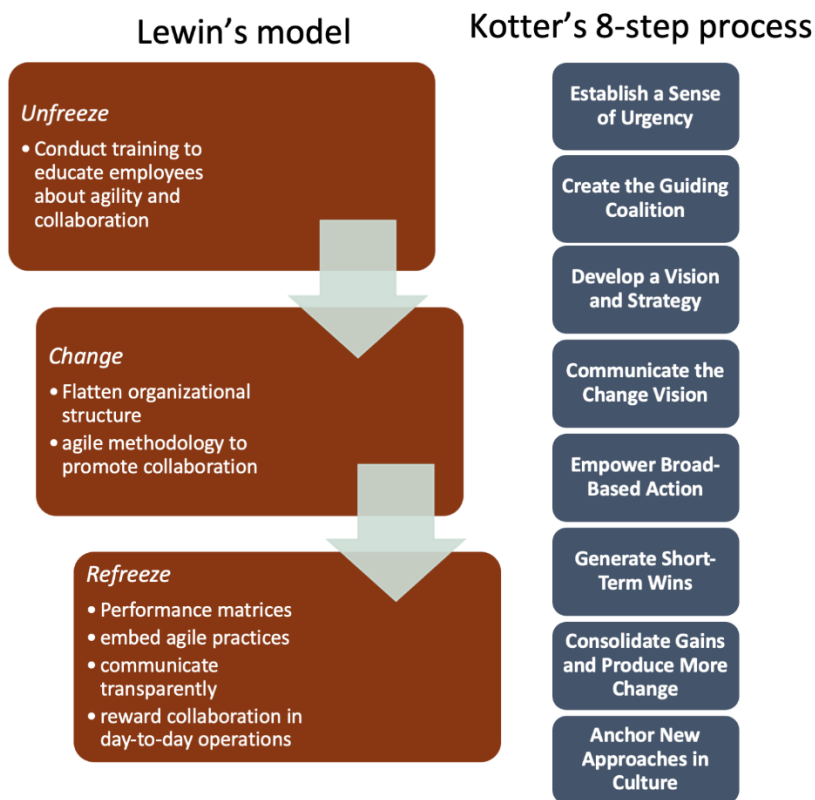
Open innovation <sup>54</sup> and collaboration are instrumental in driving successful innovations in the obesity business sector. Engaging with key stakeholders like healthcare providers, community organizations, and policymakers is vital for developing and implementing effective solutions. Community-based participatory research <sup>107,108</sup> is especially important for building trust especially in under-represented communities. Collaboration ensures that innovative approaches align with

diverse stakeholders' needs and preferences, enhancing their acceptance and impact.

1. ASK: Establishing key partnerships is essential for driving innovation and adoption of obesity solutions. Identify stakeholders who can contribute expertise and resources throughout the innovation lifecycle, including healthcare providers, technology companies, and community organizations. Regular communication and collaboration with partners are crucial for aligning goals and maximizing impact.
2. DO: Conducting a stakeholder analysis helps prioritize engagement efforts and tailor communication strategies. Develop a stakeholder matrix to categorize stakeholders based on their interest and influence in the innovation process. Consider factors such as attitudes towards obesity and potential to support innovation efforts to build consensus and address barriers.
3. MEASURE: Evaluating stakeholder engagement involves assessing involvement, satisfaction, and collaboration throughout the innovation process. Implement feedback mechanisms and surveys to gather insights into stakeholders' perceptions and needs. Measure participation rates and communication effectiveness to gauge success and identify areas for improvement. Regular communication and feedback help maintain stakeholder buy-in and commitment to obesity innovation initiatives, driving successful outcomes.

**CHANGE MANAGEMENT:**

Effective change management is crucial for implementing innovative strategies in the obesity business domain. Models like Lewin's <sup>56</sup> and Kotter's <sup>77</sup> are schemata for managing organizational change (Figure 4).



**Figure 3.** Lewin <sup>56</sup> and Kotter <sup>77</sup> schemata for change management.

By following structured change management processes, businesses can facilitate the adoption of new ideas and practices, increasing the likelihood of successful innovation implementation.

1. ASK: Clear leadership and management are essential for guiding innovation. Assign leaders to champion the process, develop a strategic vision, and communicate its importance. Establish clear roles and responsibilities for team members, ensuring alignment and momentum throughout the change journey. Leadership transition (discussed below) needs to be addressed early in an innovation cycle and a NewCo's life.
2. DO: Define timelines and deliverables to manage implementation efficiently. Break down the innovation process into manageable phases with realistic timelines and specific milestones. Regularly review and adjust timelines based on feedback and changes to ensure alignment with strategic objectives.
3. MEASURE: Objective systems for defining adherence provide a framework for assessing effectiveness. Implement metrics and evaluation criteria aligned with strategic goals, focusing on indicators such as adoption rates and user satisfaction. Establish processes for collecting,

analyzing, and reporting data transparently to stakeholders, allowing for informed decision-making and continuous improvement in combating obesity.

#### DYNAMIC ADAPTATION:

In the dynamic obesity market and healthcare landscape, organizations must exhibit dynamic adaptation capabilities <sup>58</sup>. This involves continuously refining products or services based on evolving consumer preferences, scientific advancements, or regulatory changes. The ability to pivot in responses to changing market forces is critical <sup>81</sup>.

1. ASK: A comprehensive plan for pivot and adaptation is essential to ensure responsiveness in a rapidly changing market. An assessment is needed of internal and external factors influencing obesity business development. Identify potential pivot points and areas for adaptation, establish clear goals, objectives, and metrics, and allocate resources for seamless execution.
2. DO: Continuous monitoring of the market is crucial for identifying trends, disruptions, and opportunities. Track macroeconomic indicators, industry trends, regulatory developments, and competitor activities. Implement robust data collection and

analysis processes to gather real-time insights and anticipate changes.

3. MEASURE: Real-time tracking of market-versus-response enables timely adjustments to adaptation strategies. Implement monitoring systems and analytics tools to track key performance indicators related to obesity innovation initiatives. Actively solicit feedback from customers, stakeholders, and internal teams to optimize responsiveness and agility. By continuously tracking market dynamics and response, organizations can ensure alignment with market needs, driving sustained success in the dynamic obesity business environment.

#### RESOURCE ALLOCATION:

The resource-based view <sup>83</sup> highlights the importance of effectively allocating resources to support innovation in obesity business development, whether through research and development, acquiring specialized talent, or forming strategic partnerships.

1. ASK: Assessing resource availability is crucial for successful execution. Identify required resources, such as financial capital, talent, and technology, and evaluate internal capacity versus external needs. Develop strategies to acquire or reallocate resources effectively to mitigate risks and optimize performance; a frequent mistake is to under-resource a new venture <sup>84</sup>.
2. DO: Perform resource mapping to categorize and prioritize resources based on their contribution to innovation outcomes. Establish financial controls and budgeting mechanisms to monitor resource allocation and ensure accountability.
3. MEASURE: Implement tracking systems to monitor resource utilization throughout the innovation lifecycle. Regularly review allocation against planned targets, communicate transparently with stakeholders, and adjust plans as needed to optimize resource allocation and maximize the impact of obesity innovation initiatives.

In summary, the DACMAR framework presents a structured approach to innovation and change in the obesity business domain, offering a systematic guide for entrepreneurs and stakeholders to navigate challenges and capitalize on opportunities. By employing the DACMAR principles of Disrupt, Adopt, Collaborate, Manage, Adapt, and Resource, innovators can drive meaningful

progress and innovation in obesity management, ultimately contributing to improved health outcomes and quality of life for affected individuals. The ASK, DO, MEASURE approach provides a practical framework for applying the DACMAR principles in real-world settings, guiding stakeholders through the process of assessing innovation disruptiveness, performing competitive market analysis, measuring market readiness, evaluating resource allocation, fostering collaboration, managing change, and dynamically adapting to evolving circumstances. By addressing key questions, taking decisive actions, and measuring outcomes at each stage, stakeholders can enhance the effectiveness and sustainability of obesity innovation initiatives.

#### Application of a practical innovation framework by investors.

A critical issue with respect to investment in innovation is finding an objective approach to comparing one innovation against another. Investors want to de-risk acquisitions and investments and oftentimes objective comparators are unavailable <sup>84</sup>. The DACMAR framework provides a structured approach to rank innovations, enabling investors to make informed decisions.

#### DISRUPT:

ASK: Investors can assess how disruptive an innovation is by evaluating its potential impact on existing weight management norms and market dynamics.

DO: Conducting a competitive analysis helps investors understand the innovation's position in the market and its potential for success.

MEASURE: By evaluating market readiness, investors can gauge customer and stakeholder willingness to adopt the innovation, which is crucial for investment success.

#### ADOPT:

ASK: Understanding the target users and their needs helps investors determine the innovation's potential for adoption and market fit.

DO: Developing a comprehensive plan for market access helps investors assess the innovation's scalability and potential for widespread adoption.

MEASURE: Measuring determinants for adoption helps investors assess the innovation's potential for success in the market.

#### COLLABORATE:

ASK: Identifying key partnerships and stakeholders helps investors assess the innovation's potential for collaboration and market support.

DO: Conducting a stakeholder analysis helps investors prioritize engagement efforts and assess the innovation's alignment with stakeholder needs.  
 MEASURE: Evaluating stakeholder engagement helps investors assess the innovation's potential for long-term success and market impact.

**INNOVATION MANAGEMENT:**

ASK: Ensuring clear leadership and management helps investors assess the innovation's potential for effective implementation and market success. Are the founders willing to acquiesce leadership for the sake of the enterprise's success?

DO: Defining timelines and deliverables helps investors assess the innovation's potential for timely and successful market entry.

MEASURE: Implementing metrics aligned with strategic goals helps investors assess the innovation's progress and potential for market impact.

**ADAPT:**

ASK: Developing a plan for pivot and adaptation helps investors assess the innovation's potential for market responsiveness and long-term success.

DO: Continuously monitoring the market helps investors assess the innovation's potential for market fit and competitive advantage.

MEASURE: Tracking key performance indicators helps investors assess the innovation's progress and potential for market impact.







**RESOURCE:**

ASK: Assessing resource availability helps investors assess the innovation's potential for successful implementation and market impact and the level of investment required.

DO: Performing resource mapping helps investors assess the innovation's potential for efficient resource allocation and utilization.

MEASURE: Implementing tracking systems helps investors assess the innovation's progress and potential for market impact.

Figure 5 is an example of how four competing investments were compared using the DACMAR framework.

	 <b>Disrupt</b> Innovation as Disruption	 <b>Adopt</b> Adoption and Diffusion	 <b>Collaborate</b> Openness and Collaboration	 <b>Manage</b> Change Management	 <b>Adapt</b> Dynamic Adaptation	 <b>Resource</b> Resource Utilization	<b>Score</b>
Investment 1	*	*****	*****	*****	*****	*****	26
Investment 2	***	*	**	***	**	*	13
Investment 3	*	****	***	***	****	**	17
Investment 4	*****	*****	*****	*	*****	*****	26

**Figure 5.** Application of the DACMAR framework by investors to rank innovations. Comparison of five innovation opportunities using the DACMAR framework. Scale: \*\*\*\*\* highly developed; \*\*\*\* well developed; \*\*\* moderately developed; \*\* poorly developed and \*not developed. Investment 1 is well structured but not disruptive; Investment 4 is disruptive but requires management support. Investments 2 and 3 are unattractive.

By applying the DACMAR framework's principles, investors can systematically rank different innovations in the obesity domain, ensuring market-readiness, identify go-to-market gaps and align investments with investors' strategic objectives. This enables objective de-risking to improve investment returns.

**Leadership of innovation and change in obesity innovation.**

**THEORIES OF LEADERSHIP IN INNOVATION AND CHANGE**

Effective leadership is critical in innovation & change <sup>75,132-134</sup> as evidenced by data suggesting that leadership explains 26-32% of workplace engagement across continents, outstripping the influence of cultural factors <sup>135</sup>. Several leadership archetypes <sup>49</sup> that drive innovation are shown in Table 5.

**Table 5.** Leaderships archetypes, citations, and examples.

Leadership Style	Explanation	Example
<b>Transformational Leadership</b> <sup>109,110</sup>	A leader's capacity to inspirationally motivate followers to accomplish exceptional outcomes.	Steve Jobs <sup>101</sup> promoted innovation through valour and by fostering a shared vision, encouraging creativity, and empowering teams.
<b>Transactional Leadership.</b> <sup>111</sup>	A leader who focuses on supervision, organization, and performance.	Lara Morgan is recognized for transactional leadership, notably as founder of the luxury toiletry business Pacific Direct <sup>112</sup> .
<b>Adaptive Leadership.</b> <sup>113</sup>	A leader who guides organizations through challenges that lack clear solutions. Adaptive leaders address complex problems through adaptation rather than through reliance on predefined strategies.	Typical of the healthcare industry, an example is leadership of Mayo Clinic through Covid <sup>114</sup> .
<b>Collaborative-type Leadership.</b> <sup>115</sup>	Helps organizations navigate fluctuating market-forces by encouraging innovation, flexibility, and employee empowerment.	Indra Nooyi, CEO of PepsiCo from 2006-2018, was recognized for her collaborative approach to leadership and her emphasis on teamwork.
<b>Servant Leadership.</b> <sup>116</sup>	The needs of team members come ahead of the leader's needs. Servant leaders selflessly engender a culture of trust and collaboration inspiring innovation and change by building an atmosphere of valued and supported employees.	Herb Kelleher, CEO of Southwest Airlines exemplifies servant leadership <sup>117</sup> .
<b>Innovation Leadership.</b> <sup>118,119</sup>	Innovation Leadership emphasizes the role of a leader as the focus for innovation within an organization's culture. Innovative leaders focus on the creation of environments that embrace intellectual diversity, risk-taking novelty, and creativity.	At Apple Computer Tony Fadell drove the development of the iPod, intentionally revolutionizing music delivery and access <sup>120</sup> .
<b>Charismatic leadership.</b> <sup>121</sup>	Often impactful in politics and religion, Charismatic Leadership can be effective in corporate settings for driving innovation and change. Traits of these leaders include effective communication, visionary capacity, passion, confidence, and commitment.	The list includes, Richard Branson (Virgin), Vineeta Singh (Sugar Cosmetics), Jeff Bezos (Amazon) and Elon Musk, (Tesla) <sup>122</sup> .
<b>Distributed Leadership.</b> <sup>123</sup>	Counter-intuitive leadership model emphasizing that leadership is not the sole remit of one person but can be shared. Distributed Leadership confers diverse perspectives and skill sets which accelerates implementation of creative solutions, change and innovations.	Seen most often in schools <sup>124</sup> . The co-founders of Google, Sergey Brin and Larry Page, nurtured a culture of distributed leadership <sup>125</sup> .
<b>Authoritarian Leadership.</b> <sup>126,127</sup>	A business may require this type of leader especially during restructuring, and financial stress.	Lee Iacocca, who restructured and saved Chrysler was known for Authoritarian Leadership <sup>128</sup> . Microsoft CEO, Bill Gates used this style of leadership <sup>129</sup> .
<b>Affiliate Leadership.</b> <sup>130</sup>	Fosters team harmony, prioritizes emotional connections, encourages inclusion, resolves conflicts, and requires valuing others' emotions with heightened awareness of their emotional needs.	Jacinda Ardern <sup>131</sup> exemplifies this leadership style.

One leader can potentially harness several leadership styles to uniquely influence and facilitate innovation and change. Some argue that a person's leadership archetype is wired into her/his DNA akin to personality type <sup>136</sup>. Contrarily, leadership can

be learned <sup>4</sup>, and it behoves an intentional innovation/change leader to leverage different leadership styles at different stages of an organisation's evolution. An example is shown in Figure 6.





**Figure 6.** Time vs. stock price for leadership transitions for a fictional wearable technology company. Transactional leadership (A) gave way to Innovation Leadership (B, C) predicated by new technology. A Collaborative Leader (D) forced growth. (E) Technical failure caused stock collapse and Authoritarian Leadership (F) restructured the company before Affiliate(G) and, Adaptive (H) Leadership guided regrowth.

Regardless of leadership style, a leader uses a mixture of hard and soft skills (Table 6). Hard leadership skills are objective capabilities used to effectively direct organizations. These contrast with

soft skills, which are interpersonal skills more associated with emotional intelligence. Both hard and soft skills are necessary for effective leadership <sup>135,137</sup>.

**Table 6.** Hard and soft leadership skills. Items shown in blue are the top four leadership skills determined by data from 6 continents, between 1987-2012 by Kouzes and Posner <sup>135</sup>.

Hard Skills	Soft skills
<b>Strategic Planning:</b> Develops and executes long-term plans to achieve organizational goals.	<b>Communication:</b> Important for effective leadership encompassing, active listening, the capacity to convey ideas clearly, and foster bilateral communication.
<b>Financial Management:</b> Understands and manages budgets, financial statements, and resources to ensure organizational financial health.	<b>Empathy:</b> Able to understand and share people's feelings. The capacity to interact with team members on a personal level.
<b>Project Management:</b> Plans, executes, and oversees projects efficiently; meets deadlines and achieves objectives.	<b>Adaptability:</b> Flexible and amenable to change. The capacity to navigate uncertainty and adapt leadership to change.
<b>Data Analysis:</b> Identifies trends and areas for improvement. Interprets data to make informed decisions.	<b>Conflict Resolution:</b> The capacity to tackle and resolve conflicts in a productive manner.
<b>Decision-Making:</b> Makes timely and effective decisions based on available data. Determines the impact of decisions on the organization.	<b>Motivation:</b> Inspiring and motivating team members. Leaders who encourage and support their teams often achieve better outcomes.
<b>Technical Proficiency:</b> Depending on the industry, leaders need specific technical skills related to the products, services, or processes of the business.	<b>Team Building:</b> Creating a positive, cohesive, and collaborative team environment helps deliver a high-performing team.
<b>Change Management:</b> Guides the organization through change, whether it is a structural, managerial, or innovative.	<b>Positive Attitude:</b> Maintaining a positive and optimistic outlook can help the team's morale and workplace culture.
<b>Risk Management:</b> Identifies risks, de-risks, and develops strategies to mitigate and manage risk <i>a priori</i> .	<b>Decision-Making:</b> Considers different perspectives and involves the team in decision-making.
<b>Performance Measurement:</b> Determines, measures, and responds to key performance indicators (KPIs). Deploys KPI's to drive organizational performance and improvement.	<b>Trustworthiness:</b> Being reliable, transparent, and trustworthy is crucial for building trust within the team.
<b>Negotiation Skills:</b> Negotiates effectively, internally, externally, with governance and the Board.	<b>Coaching and Mentoring:</b> Develops team members' skills and guides professional growth.

## Critique of leadership styles

Leadership style can be matrixed with key innovation/change components to strategically optimize impact (Table 7). While leadership

theories in innovation and change are important<sup>135</sup>, there are critical assumptions that need to be considered.

**Table 7.** Leadership styles can be matrixed with key innovation and change components to strategically optimize impact.

Innovation Elements	Leadership Types
Innovation as Disruption	Transformational Leadership, Innovation Leadership, Adaptive Leadership, Dynamic Adaptation
Adoption and Diffusion	Transactional Leadership, Adaptive Leadership, Distributed Leadership
Openness and Collaboration	Collaborative-type Leadership, Servant Leadership, Innovation Leadership, Transformational Leadership, Distributed Leadership
Change Management	Transformational Leadership, Adaptive Leadership, Innovation Leadership, Distributed Leadership
Dynamic Adaptation	Transformational Leadership, Adaptive Leadership, Distributed Leadership
Resource Utilization	Transactional Leadership, Adaptive Leadership, Distributed Leadership

A static view of leadership could be that a leader is hired to embody one of the specific archetypes shown in Table 5. Effective leaders can be trained<sup>4</sup> to employ a dynamic and adaptive approach, adjusting their style based on the challenges and context met by their organization<sup>49</sup>. Market forces may necessitate a combination of leadership styles, and the dynamics of hybrid approaches are more realistic but rarely quantified. Innovation is dynamic and an organisation goes through several growth/contraction phases. Leaders and leadership behaviours must adapt to best serve the interests of the enterprise.

Just as with theories of innovation and change, leadership theories lack critical evaluation, scientific rigor, and scrutiny. Assumptions about leadership styles are mostly gained from case histories, unvalidated questionnaires, and post-hoc analysis<sup>138,139</sup>. Randomized controlled trials of leadership archetypes versus impact have not been conducted but artificial intelligence affords new opportunities in this space<sup>71</sup>.

Leadership dialogs generally emphasize positive attributes of leadership without adequately addressing potential downsides. For instance, while transformational leaders are sought-after for inspiring innovation, they may neglect routine operational functions. For instance, compassion is assumed to be a positive soft skill, whereas lack of empathy is assumed to be negative. This generalization, which can be false, is rarely questioned<sup>63,127,140</sup>.

The terminology used to describe leadership styles is inconsistent. For example, terms like Collaborative-type Leadership and Affiliate Leadership, might be differently interpreted by stakeholders. Clear and consistent definitions are

important for effective communication of executive expectations.

Highly praised leaders, such as Steve Jobs, Elon Musk, and Jacinda Ardern, are mostly from Western cultures. These leadership types might fail in other cultures such as in Asia. Leadership theories can manifest differently in diverse cultures, and the leadership discourse often lacks global perspective. Cultural analysis is important in leadership optimization.

The ethical axis is often overlooked in leadership consideration. For obesity innovation this is especially important as people with obesity are frequently exploited<sup>141-143</sup>. While Authoritarian Leadership may be necessary during periods of crisis, it has potentially negative impact on employee morale, mental health, and well-being. Environmental impact and a company's social responsibility needs to be incorporated in a leader's evaluation. Another ethical issue relates to compensation; change-leaders may be appraised as unethical for accepting large bonuses after failed innovations.

A frequent fault in leadership deliberation is to neglect the reciprocal relationship of leader-to-followers. A more holistic critique should consider how leadership styles interact with and influence the behaviours of followers; effective leadership is two-way. In this regard, the Chief Executive Officer of Mayo Clinic has an intentionally pre-determined term limit and is hired from within the organisation<sup>144</sup>. This stabilizes the relationship between followers and leadership.

Lastly, there are no agreed-upon objective measures for leadership performance beyond key financial deliverables<sup>140</sup>. For instance, happiness

measures, retention, staff satisfaction, and employee health are rarely primary outcomes against which leaders are evaluated. Prospective research has not been conducted to objectively determine which leadership motifs best deliver innovation and change within given settings<sup>140</sup>, although this arena is amenable to artificial intelligence methodology<sup>71</sup>.

## Leadership styles applied to a framework for innovation

The DACMAR framework and the various types of leadership styles mentioned, namely Transformational, Collaborative, Servant, Adaptive, Innovative, and Strategic leadership, are closely related in the context of addressing obesity innovation.

Transformational leaders<sup>110</sup> align with the "Disrupt" principle of the DACMAR framework and within the obesity innovation space can inspire stakeholders to envision a healthier future and drive substantial change. They can motivate healthcare providers, policymakers, researchers, and community leaders to collaborate on comprehensive strategies for obesity prevention, management, and treatment. These leaders emphasize the importance of embracing innovative approaches, such as leveraging technology for remote patient monitoring or developing community-based interventions, to tackle the multifaceted nature of obesity. Their actions involve motivating stakeholders to embrace innovative approaches, fostering collaboration, and driving comprehensive strategies for obesity prevention, management, and treatment. The outcome measure would involve measuring the extent of transformative change achieved under their leadership.

Innovative leaders<sup>140</sup> align with the "Disrupt" principle of the DACMAR framework. Innovative leaders drive breakthroughs in obesity prevention, management, and treatment by challenging conventional thinking and exploring new frontiers in research and technology. They invest in cutting-edge approaches, such as precision medicine, genetic testing, or artificial intelligence, to personalize interventions and optimize outcomes for individuals with obesity<sup>145,146</sup>. Innovative leaders foster a culture of curiosity and experimentation, encouraging teams to explore bold ideas and take calculated risks in pursuit of transformative innovations. Their actions involve investing in cutting-edge approaches and fostering a culture of curiosity and experimentation. The outcome measure would involve assessing the impact of transformative innovations on obesity prevention, management, and treatment.

Collaborative leaders align with the "Collaborate" principle of the DACMAR framework, which is especially important when considering academia spin-offs<sup>147,148</sup>. They emphasize the importance of partnerships and collective action, which is essential for developing public-private and holistic solutions to address obesity. Collaborative leaders can foster interdisciplinary partnerships between healthcare professionals, nutritionists, fitness experts, technology developers, and policymakers to develop holistic solutions<sup>149</sup>. By creating platforms for knowledge exchange and joint problem-solving, these leaders facilitate the co-creation of innovative interventions that address various determinants of obesity, from dietary habits and physical activity to environmental factors and socioeconomic disparities. Their actions involve fostering partnerships between various stakeholders and creating platforms for knowledge exchange. The outcome measure would involve assessing the effectiveness of joint problem-solving and the development of comprehensive interventions.

Servant leaders<sup>150</sup> aligning with the "Adapt" principle of the DACMAR framework, prioritize the needs of individuals and communities affected by obesity, advocating for interventions that are accessible, culturally sensitive, and empowering. Ethical leadership is critical in obesity innovation, as people with obesity can be exploited by false and exaggerated claims; Servant Leadership is ethical<sup>141,142</sup>. Servant leaders are particularly effective in healthcare innovation<sup>151</sup> listening to the voices of patients and community members, seeking their input in the design and implementation of obesity prevention and treatment programs. These leaders prioritize equity and social justice, addressing underlying structural barriers to healthy living and promoting inclusive approaches to obesity care. Their actions involve listening to the voices of patients and community members, seeking their input in program design. The outcome measure would involve assessing the inclusivity and effectiveness of obesity prevention and treatment programs developed under their leadership.

Adaptive leaders align with the "Adapt" principle of the DACMAR framework. The obesity landscape is constantly evolving, requiring adaptive leaders who can navigate shifting trends, emerging evidence, and evolving policy environments. Adaptive leaders in obesity innovation are agile and responsive, adjusting strategies and tactics based on feedback and new insights which is especially important in a technology environment of rapid change<sup>152,153</sup>. Adaptive leaders encourage experimentation and learning, recognizing that

failure is often a necessary step towards innovation. These leaders foster a culture of continuous improvement, encouraging teams to iterate on ideas and refine interventions over time. Their actions involve adjusting strategies based on feedback and new insights, fostering a culture of continuous improvement. The outcome measure would involve assessing the ability of the organization to adapt to changing circumstances effectively.

Strategic leaders align with the "Manage" and "Resource" principles of the DACMAR framework<sup>139</sup>; they develop long-term visions and roadmaps for achieving population-wide impact in the fight against obesity<sup>27</sup>. Strategic leaders prioritize evidence-based strategies<sup>154</sup> with the potential for scalability and sustainability, leveraging artificial intelligence, data analytics and predictive modeling to inform decision-making<sup>71</sup>. These leaders align innovation efforts with public health priorities, identifying high-impact interventions and allocating resources strategically to maximize their reach and effectiveness. Their actions involve developing long-term visions and roadmaps, prioritizing evidence-based strategies, and aligning innovation efforts with public health priorities. The outcome measure would involve assessing the scalability and sustainability of interventions developed under their leadership.

In essence, each type of leadership style contributes uniquely to the DACMAR framework's principles, providing a holistic approach to innovation and change in the context of addressing obesity. Effective leaders can employ several leadership styles over their tenure. Alternatively, a NewCo may employ serial leaders over its lifespan with different skill sets to innovate, grow, and sustain the business. The right leadership at the right time foreshadows success, the converse is deleterious. In summary, effective leadership is essential for driving innovation in addressing the obesity epidemic. Transformational, innovative, collaborative, servant, adaptive, and strategic leadership styles each bring unique strengths to an enterprise, shaping the direction, culture, and impact of obesity prevention and treatment efforts. By leveraging diverse leadership approaches, stakeholders can work together to develop

innovative solutions that improve outcomes for individuals and communities affected by obesity.

## Conclusion

In conclusion, obesity is a fertile innovation space, to help address the pressing global health crisis. With the obesity market valued at >\$80 billion annually, entrepreneurs, healthcare providers, and technology developers have ample opportunities for transformative solutions.

New ventures focusing on obesity-related services, from medical weight loss clinics to technology-driven interventions, cater to the growing demand for innovative approaches. Meanwhile, existing businesses can innovate within their sectors, such as food production and healthcare, by reformulating products, introducing healthier alternatives, and leveraging technology for obesity prevention and treatment. Collaboration across sectors fosters partnerships and collective action toward effective solutions.

Innovation frameworks such as, DACMAR provide strategic guidance for navigating the complexities of innovation and change management, while effective leadership remains pivotal in inspiring vision and driving impactful outcomes.

In essence, the intersection of innovation and obesity offers a platform for change, where businesses play a crucial role in shaping healthier futures for individuals and communities. Through creativity, collaboration, and a commitment to evidence-based practices, innovation can not only drive economic growth but also contribute significantly to mitigating one of the most critical public health challenges of our time.

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