Vital Wave ℠

digital square

How product attribute needs vary by digital health maturity level and influence rates of scale

Phase 1 Detailed Analysis

July 2020

Executive Summary

- Digital Square conducted research to understand how digital health product requirements may vary across different [digital health maturity levels](#)

  - 10 Global Goods and 11 proprietary product developers were interviewed to understand what product attributes their respective products had and why these attributes were important for different digital health maturity contexts
  - Product developers worked across various WHO digital health system categories

- We found that it is difficult to develop products that meet the needs across all digital health maturity level

Key product attributes important for lower digital health maturity levels (1-3)	Key product attributes important for higher digital health maturity levels (4-5)
- Offline functionality - Data compression - Mobile interface including SMS capabilities	- Software as a service (SaaS) - Western regulatory requirements (e.g., HIPPA) - Artificial intelligence (AI) are important in select circumstances

- High cost to sell and sporadic funding were cited as reasons on why developers working predominantly in high digital health maturity markets did not invest in research and development to adapt product attributes

- Developers working in predominantly low digital health maturity markets found it challenging to scale given donor driven, disease-siloed and project-based nature of the funding

Agenda

- **Objective and methodology**
- Product classification
- Product presence across market maturity levels
- Customer segmentation and market penetration
- Relevant product attributes, by market maturity level

21 digital health products were assessed to determine how product features vary across different market maturity segments

Objective	• **Assess how product attributes vary across digital market maturity segments**
Methodology	• Phone interviews conducted with 10 Global Good and 11 Non-Global Good solution providers (minimum of 10 each) between May and July 2020 • *Solution selection criteria:* Inclusion of a mix of WHO solution classifications, Global Good and Non-Global Good providers, different business models, and diversified presence across digital health maturity market levels.
Global Good	• Bahmni, DHIS2, Dimagi CommCare, iHRIS, ODK, OpenHIM, OpenIMIS, OpenLMIS, OpenSRP, Reveal (10)
Proprietary Focus: low DH maturity	• BroadReach, Mezzanine, Mobenzi, SystemOne, Zenysis (5)
Proprietary Focus: global	• Ada, Magpi, Mapbox, RLDatix, Salesforce, Twilio (6)

Surveyed providers were asked questions related to the product's market presence, market share and attributes

Key questions:

- What digital health market maturity segment(s) do you work in?

- Who are your key customers (and/or end-users)?

- How much of your customer segment do you reach?

- What additional market segments, if any, do you want to pursue in the future?

- What product features does your product have (of the 14 defined product attributes)?

  - Of the ones not selected, why are these not included?

  - Of the ones that are selected, why did you choose to include these?

For each product, 14 attribute categories were evaluated

No.	Product Attribute	Definition
1	**HIPAA/GDPR compliant**	Product adheres to the requirements of HIPAA/GDPR.
2	**Artificial intelligence (AI) / machine learning (ML)**	Product takes advantage of machine learning or other artificial intelligence.
3	**De-duplication**	Product eliminates duplicate copies of data, thereby optimizing storage.
4	**User interface (UI) / User experience (UX)**	Company has dedicated resources to user experience and user interface in product design.
5	**High record capacity**	Product can store high numbers of records.
6	**SaaS**	Product is currently available as a software as a service (SaaS) offering to users.
7	**Cloud-based access**	Product is cloud-ready, i.e. users can access it via networks and the internet.
8	**Open source**	Product source code is available for the public to view or edit and is available under an open source license.
9	**Automation**	Product automatically sequences from one task and/or field to the next.
10	**Offline functionality**	Product can be used without an internet connection.
11	**Small data packets**	Product can compress data into smaller file sizes, thus enhancing speed and storage capacity.
12	**SMS**	Product uses SMS as a means of interaction with the user.
13	**Mobile interface**	Product has a mobile interface for users to interact with.
14	**Health insurance workflows**	Product incorporates health insurance functionality (e.g. customer service, claims processing, etc.).

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World Health Organization (WHO) classification of digital health system categories

- WHO classified digital health interventions to help diverse communities working in digital health – including government stakeholders, clinicians, implementers, researchers, donors and other stakeholders – to have a standardized vocabulary

- The system category classification represent the information and communication technology applications designed to deliver WHO interventions

- A wide range of system categories were assessed in this work

SYSTEM CATEGORIES

A	Census, population information & data warehouse*
B	Civil registration and vital statistics
C	Client applications
D	Client communication system
E	Clinical terminology and classifications*
F	Community-based information system
G	Data interchange interoperability and accessibility*
H	Electronic medical record*
I	Emergency response system*
J	Environmental monitoring system*
K	Facility management information system
L	Geographic information system (GIS)
M	Health finance and insurance information system*
N	Health management information system (HMIS)
O	Human resource information system
P	Identification registries and directories*
Q	Knowledge management system*
R	Laboratory and diagnostics information system*
S	Learning and training system
T	Logistics management information system (LMIS)
U	Pharmacy information system*
V	Public health and disease surveillance system*
W	Research information system
X	Shared Health Record and health information respositories*
Y	Telemedicine

*Adapted from the International Standards Organization [3]

World Health Organization's Classification of Digital Health Interventions v1.0 system categories

10 Global Good product providers were surveyed, spanning a variety of system categories

No	Company / Organization	Product Name	WHO System Category
1	IntelliSOFT Kenya	Bahmni	Electronic medical records (M)
2	DHIS2	DHIS2 (District Health Information System 2)	Health management information system (N)
3	Dimagi	CommCare	Community-based information system (F)
4	IntraHealth	iHRIS	Human resource information system (O)
5	University of Washington	ODK (Open Data Kit)	Community-based information system (F)
6	Jembi	OpenHIM	Data interchange and interoperability and accessibility (G)
7	GIZ	openIMIS	Health finance and insurance information management system (M)
8	Village Reach	OpenLMIS	Logistics management information system (T)
9	Ona	OpenSRP	Electronic medical records (M)
10	Akros	Reveal	Public health and disease surveillance (V)

11 Proprietary product providers were surveyed, spanning a variety of system categories

Proprietary (focus low DH maturity)

No	Company / Organization	Product Name	WHO System Category
1	BroadReach	**Vantage**	Health management information system (N)
2	Mezzanine	**Stock Visibility Solution**	Logistics management information system (T)
3	Mobenzi	**Mobenzi**	Community-based information system (F)
4	SystemOne	**GxAlert/Aspect**	Laboratory and diagnostics information systems (R)
5	Zenysis	**Zenysis**	Health management information system (N)

Proprietary (focus global)

No	Company / Organization	Product Name	WHO System Category[1]
1	Ada	**Ada**	Client communication system (D)
2	Magpi	**Magpi**	Community-based information system (F) Health management information system (N)
3	Mapbox	**Mapbox**	Health management information system (N)
4	RLDatix	**RL Suite**	Public health and disease surveillance system (V)
5	Salesforce	**Salesforce**	Customer relationship management *(not in WHO)*
6	Twilio	**Twilio (various)**	Client communication system (D)

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Available data revealed that organizations are prioritizing specific digital health maturity levels

Proportion of countries with at least one digital health product

- ■ Global Goods *(n=9)*
- ■ Proprietary (Low DH Maturity) *(n=4)*
- ■ *Proprietary (Global) (n=5)*

Level 1
- 100.0%
- 60.0%
- 20.0%

Level 2
- 94.0%
- 57.0%
- 12.0%

Level 3
- 58.0%
- 29.0%
- 10.0%

Level 4
- 18.0%
- 4.0%
- 12.0%

Level 5
- 40.0%
- 8.0%
- 64.0%

countries

Level 1	Level 2	Level 3	Level 4	Level 5
N=10	N=49	N=98	N=85	N=25
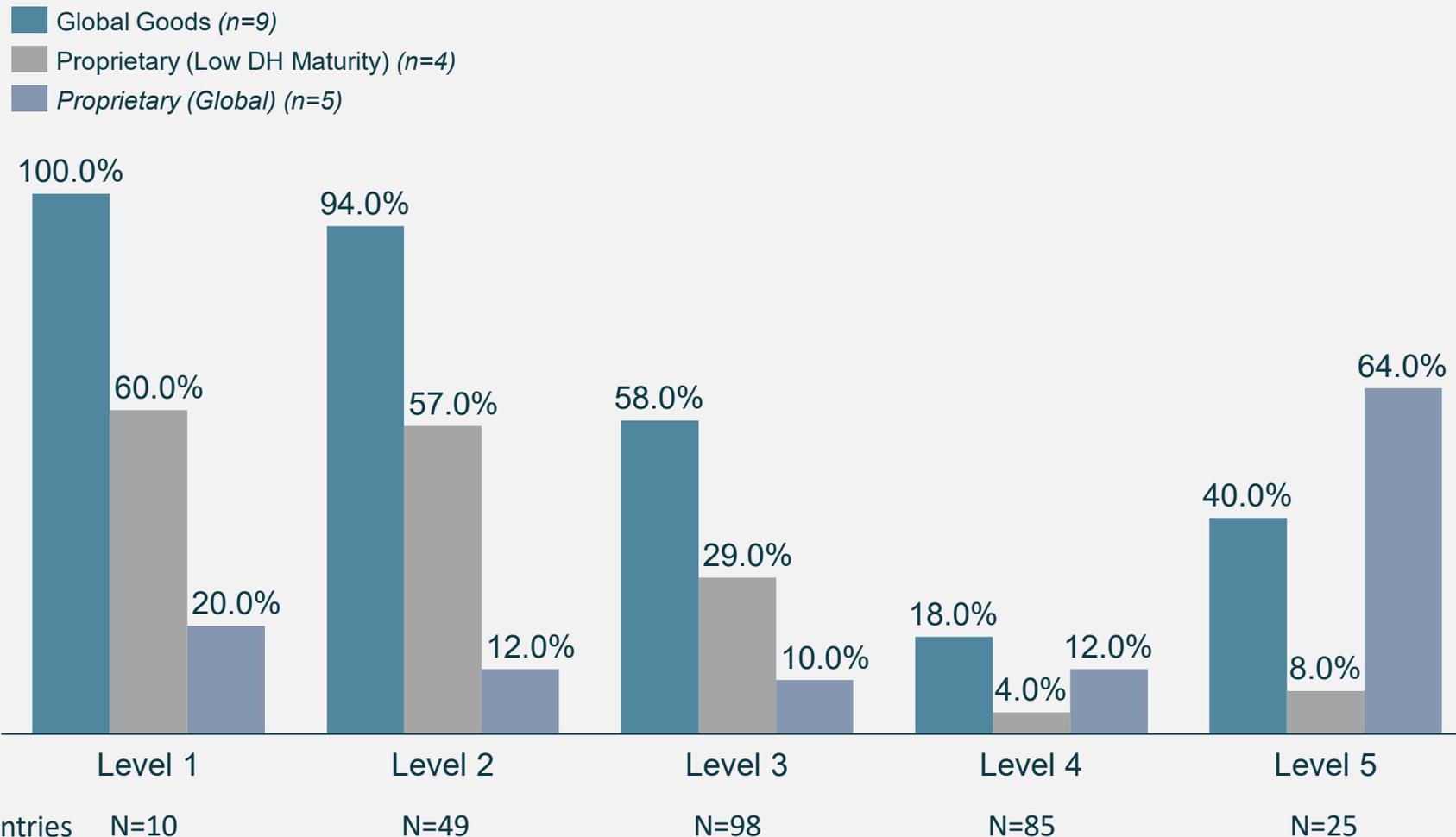
Data caveats:

- Country coverage is indicative based on interview feedback but does not include full country presence across all countries
- Several global proprietary organizations mentioned operating in more than 140 countries and did not provide comprehensive country details
- Global proprietary data underrepresents the true coverage rates

Global goods have the highest coverage in the lowest maturity levels, but some interest was expressed in expanding

Proportion of countries with at least one digital health product

- Global Goods *(n=9)*
- Proprietary (Low DH Maturity) *(n=4)*
- *Proprietary (Global) (n=5)*

	Global Goods	Proprietary (Low DH Maturity)	Proprietary (Global)
Level 1	100.0%	60.0%	20.0%
Level 2	94.0%	57.0%	12.0%
Level 3	58.0%	29.0%	10.0%
Level 4	18.0%	4.0%	12.0%
Level 5	40.0%	8.0%	64.0%

countries

Level 1	Level 2	Level 3	Level 4	Level 5
N=10	N=49	N=98	N=85	N=25
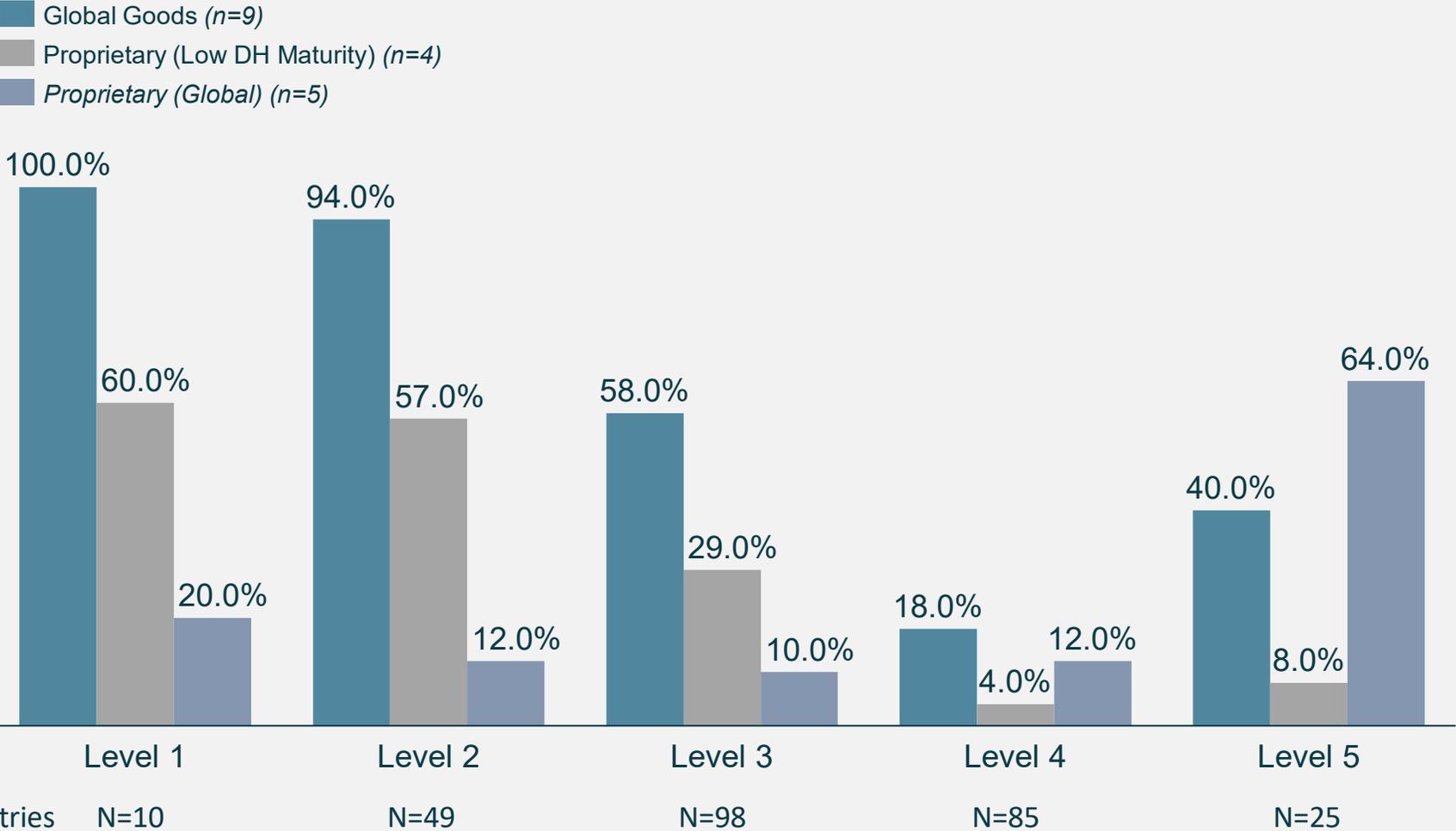
Rationale for operating in low-maturity markets
- Several conveyed that the markets they operate in are donor driven
- Integration with more sophisticated systems was thought to be challenging for some
- Intention for the products is to be in low maturity levels

Rationale for operating in higher maturity levels
- Interest expressed in helping to move countries to higher digital health maturity levels
- Not all countries are uniform and there are opportunities everywhere

Proprietary developers operate in similar market maturity levels as Global Goods offering more choice for customers

Proportion of countries with at least one digital health product

- **Global Goods** *(n=9)*
- **Proprietary (Low DH Maturity)** *(n=4)*
- *Proprietary (Global) (n=5)*

	Level 1	Level 2	Level 3	Level 4	Level 5
Global Goods	100.0%	94.0%	58.0%	18.0%	40.0%
Proprietary (Low DH Maturity)	60.0%	57.0%	29.0%	4.0%	8.0%
Proprietary (Global)	20.0%	12.0%	10.0%	12.0%	64.0%

\# countries   N=10   N=49   N=98   N=85   N=25
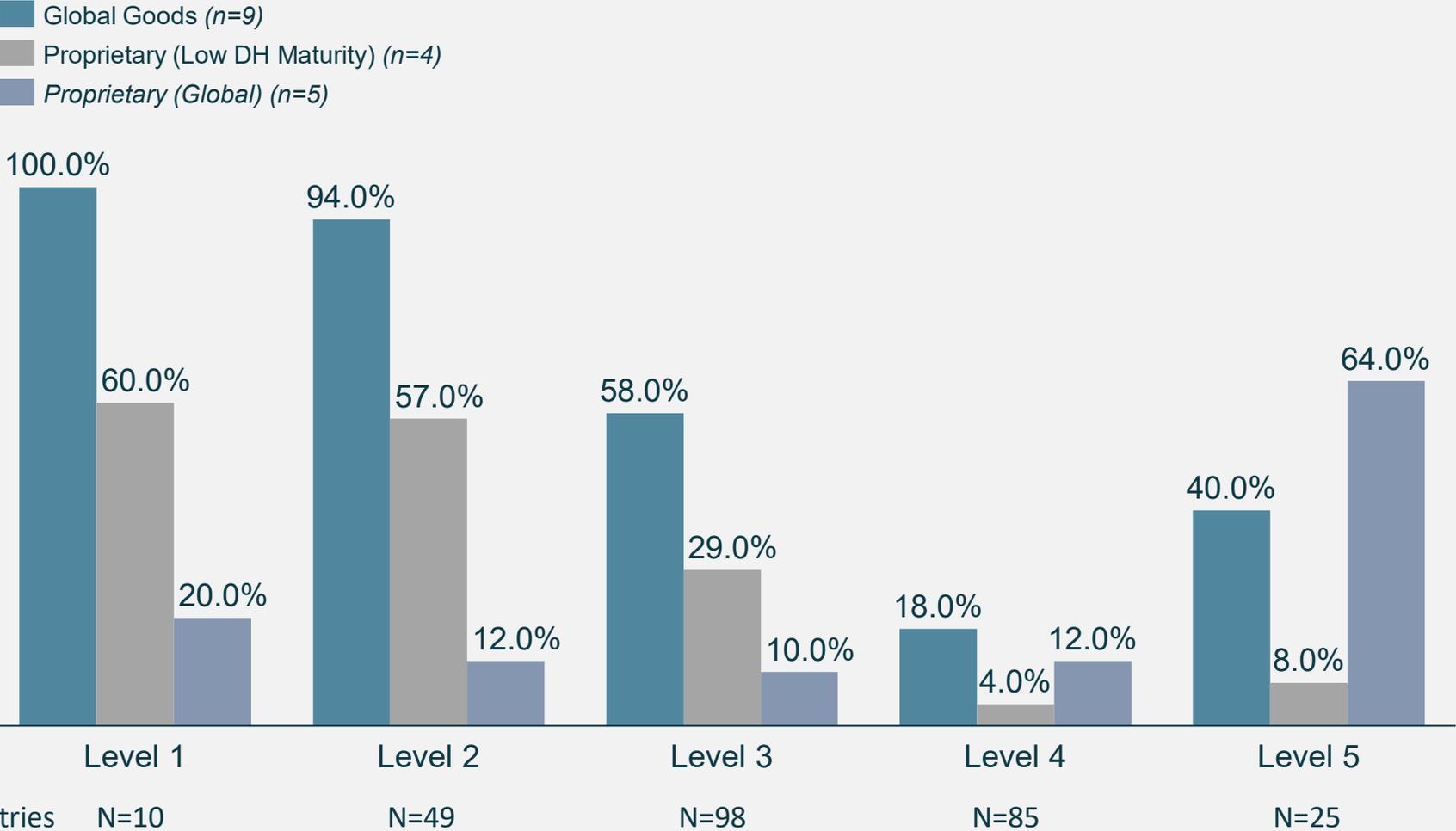
Rationale for operating in low-maturity markets

- Products are created explicitly for low-and-middle-income (LMIC) markets
- Mission focused on underserved populations
- Donor provides "use case" for operations
- Some expressed difficulty entering higher maturity markets given their relatively small number of employees and funds to compete with higher maturity market players

Rationale for operating in higher maturity levels

- Ability to integrate in to fragmented information systems
- We are generating predictive analytics that could be useful in high resource markets

Global organizations focus more heavily on high digital health maturity levels, but many have experience in lower digital health maturity contexts

Proportion of countries with at least one digital health product

■ Global Goods (n=9)
■ Proprietary (Low DH Maturity) (n=4)
■ *Proprietary (Global) (n=5)*

Level 1 — 100.0%, 60.0%, 20.0%
Level 2 — 94.0%, 57.0%, 12.0%
Level 3 — 58.0%, 29.0%, 10.0%
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Level 5 — 40.0%, 8.0%, 64.0%

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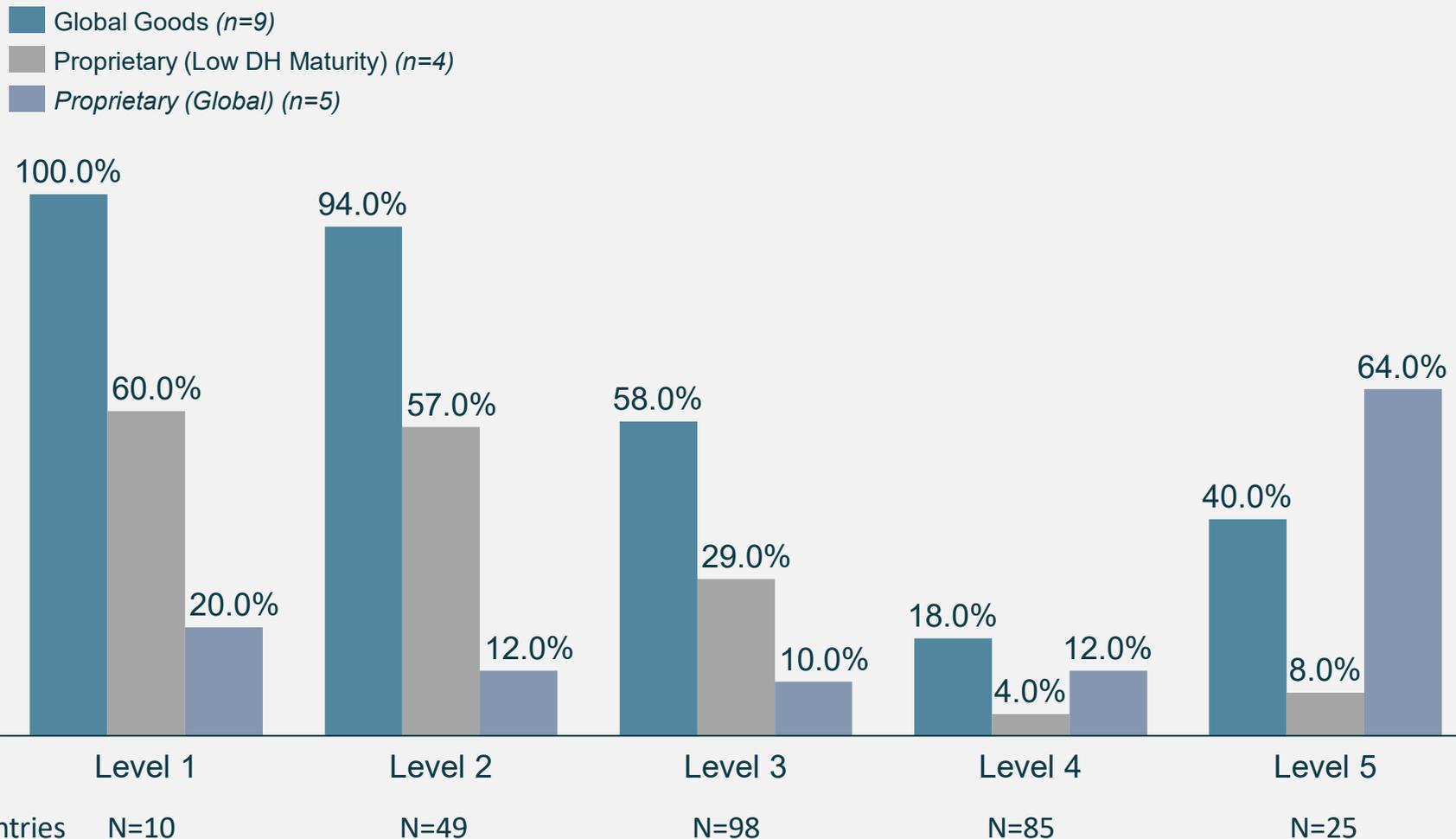
Rationale for operating in low-maturity markets
- More interest from lower digital health maturity levels given the COVID context
- Non-profits are a key client
- Several indicated that they work in more than 100 countries

Rationale for operating in higher maturity levels
- Developers acknowledged that higher digital health maturity levels are their focus

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- **Customer segmentation and market penetration**
- Relevant product attributes, by market maturity level

Products surveyed operate B2B or B2G business models, with national governments, donors and multi-national NGOs acting as main customers

Percent of developers targeting each customer type

Legend: Global Good | Proprietary (Low DH) | Proprietary (Global)
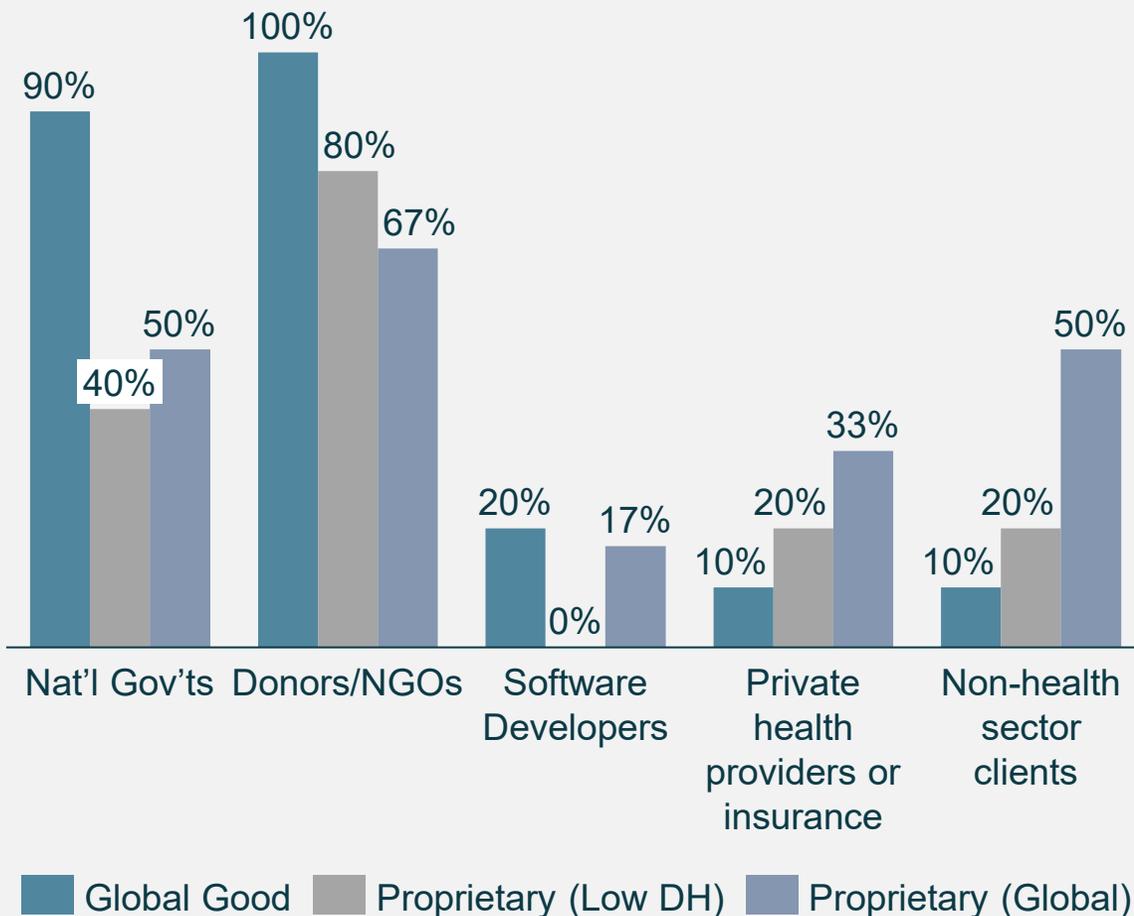
- **20 out of 21 of the digital health products surveyed operate with B2B or B2G business model.**

  - Only one proprietary organizations targets patients directly.

- **Reflecting this B2B/B2G focus, customers are mainly national governments, donors or global NGOs.**

  - This is driven from all Global Good and 45% of proprietary products surveyed operating mostly in lower digital maturity markets, where the direct buyer is usually a donor or non-profit implementing partner, who provides services for the government.

- **Proprietary organizations with a global footprint are more likely to serve private health providers or non-health sector clients than the other developer segments**.

End-users are often different than customers and include frontline healthcare workers

Percent of developers targeting each end-user type

Legend:
- Global Goods *(n=10)*
- Proprietary (Low DH) *(n=5)*
- *Proprietary (Global) (n=6)*

End-user type	Global Goods	Proprietary (Low DH)	Proprietary (Global)
National, state and/or district MOH staff	90%	100%	17%
Facility-based healthcare workers	80%	80%	17%
Community healthcare workers	40%	60%	0%
NGO and/or public health researcher	10%	0%	33%
Laboratory staff	0%	40%	0%
Software developers / IT staff	20%	0%	17%
Supply chain mngt staff	10%	20%	0%
Patients	0%	0%	17%

- Across the Global Good and proprietary products surveyed, multiple end-users were identified throughout the health system value chain.

- There is increasing focus on solutions that target and support frontline end-users to make daily on-the-job decisions, while direct-to-patient remains neglected. Areas of increased focus include patient risk assessments, case triaging and workload management.

Product market penetration was generally estimated to be low in low DH maturity markets, with high growth potential and limited competition

Scale is observed as difficult to achieve for digital health products in B2B/B2G models, unless deployed by a national government with centralized governance and sustainable financing

Most companies estimated their product's market share as low (5 to 30% of their main customer segment) and limited to certain disease programs or geographic regions in a country

- Over 10 types of digital systems[1] were surveyed, with wide variances in the applicable definition of 'market'

- Most providers found it challenging to estimate their market share, especially those operating in lower digital maturity markets

    - This could reflect a lack of robust market intelligence in lower digital market maturity levels, but also indicates expansive room for growth, with no company indicating a highly competitive share in their respective market

- Demand for attributes specific to lower digital health maturity levels are likely inadequate to incentivize global proprietary players to create differentiated solutions

- Disconnect between buyers (whose requirements drive product design) and needs of end-users may inhibit organizations ability to reach high market share

[1]Based on the World Health Organization's Classification of Digital Health Interventions v1.0 system categories

However, lower digital maturity markets display fragmented funding ecosystems that prevent scale, except when deployed by national governments

Scale is observed as difficult to achieve for digital health products in B2B/B2G models, unless deployed by a national government with centralized governance and sustainable financing

Key determinants of digital health market penetration are observed as the funding ecosystem, client type, health system structure and appropriate product design

- *Funding ecosystem:* Low or unclear market penetration of products operating in lower digital maturity markets is reflective of the donor driven, disease-siloed and project-based nature of the funding ecosystem. This results in a fragmented solution landscape that runs on one to five-year service contracts.

- *Client type:* When the national government is the primary customer, market penetration is high, applicable in both lower digital maturity markets (through donor support) or or higher digital maturity markets (through domestic government funding). This was observed in two Global Good solutions in levels 2-3 and one proprietary solution in level 5, with >90% of public sector market penetration in countries they were deployed.

- *Health system structure:* Products deployed in decentralized health systems, such as Nigeria, India and the US, are less likely to have high national market penetration.

- *Appropriate Product:* Product requirements differ for different market maturity levels and attributes that are specific to lower market maturity levels are not prioritized by global market leaders with robust marketing and selling capabilities.

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- **Relevant product attributes, by market maturity level**

Common product attribute trends were identified across the digital health maturity market levels

Relevancy of product attributes, by digital health market maturity level[1]

Level 1 (Least mature)	Level 2	Level 3	Level 4	Level 5 (Most mature)
Offline functionality				
Open source				
Data compression				
SMS				
De-duplication				
Automation				
High record capacity				
UI/ UX				
Cloud-based (access)				
Mobile interface				
Compliant to local regulation			Compliant to HIPAA/GDPR regulation	
			Artificial intelligence / machine learning	
			SaaS	

Methodology: *Chart represents 10 or more mentions that attribute fit and/or is important to the digital market maturity level and/or demonstrated the highest scores in the indicated market maturity levels.*

[1]Health insurance workflows have been excluded due to data relating to product functionality more than feature attributes.

Proportion developer segment organizations with each product attribute

Attribute	Global Goods
Open source	100%
Record capacity	100%
UX/UI	100%
Cloud-based	100%
Automated	100%
Offline	90%
Mobile interface	80%
Data compression	80%
SMS	80%
De-duplication	60%
HIPAA/ GDPR	20%
AI/ML	30%
SaaS model	30%

■ Global Goods

[1]Health insurance workflows have been excluded due to data relating to product functionality more than feature attributes.

Proportion developer segment organizations with each product attribute

Attribute	Global Goods	Proprietary(Low DH)
Open source	100%	20%
Record capacity	100%	100%
UX/UI	100%	100%
Cloud-based	100%	80%
Automated	100%	80%
Offline	90%	80%
Mobile interface	80%	80%
Data compression	80%	80%
SMS	80%	80%
De-duplication	60%	80%
HIPAA/ GDPR	20%	40%
AI/ML	30%	40%
SaaS model	30%	80%

Global Goods   Proprietary(Low DH)

[1]Health insurance workflows have been excluded due to data relating to product functionality more than feature attributes.

Proportion developer segment organizations with each product attribute

Attribute	Global Goods	Proprietary (Low DH)	Proprietary (Global)
Open source	100%	20%	17%
Record capacity	100%	100%	100%
UX/UI	100%	100%	100%
Cloud-based	100%	80%	83%
Automated	100%	80%	83%
Offline	90%	80%	50%
Mobile interface	80%	80%	100%
Data compression	80%	80%	50%
SMS	80%	80%	50%
De-duplication	60%	80%	33%
HIPAA/ GDPR	20%	40%	67%
AI/ML	30%	40%	67%
SaaS model	30%	80%	50%

Legend: Global Goods, Proprietary(Low DH), Proprietary (Global)

[1]Health insurance workflows have been excluded due to data relating to product functionality more than feature attributes.

User-centric design and high record capacity are considered important universally, while offline functionality, cloud-access and a mobile interface are key to success in lower digital maturity markets

"Offline first is a market requirement; you cannot function in the emerging markets without this."

In lower digital maturity levels…

- **Open source** solutions are predominantly Global Good products and found in lower digital maturity levels.

- **Offline functionality, cloud-access** and **data compression** were called out as essential attributes for use in lower digital maturity levels.

- Where regulation was noted, **local regulatory compliance** was found to be sufficient.

In higher digital maturity levels…

- **SaaS models** were found to be most common for customers in higher digital maturity levels but there is some interest in exploring this model at level maturity levels

- More products were found to be **HIPAA and/or GDPR-compliant.**

- **SMS, data compression** and being **open-source** was not considered as important.

Overall…

- Investments in **user-centric design** and **high record capacity** were universal across respondents, though level of resources varied.

- **Mobile interfaces** vary in sophistication and do not imply **SMS** interactions. Basic mobile-friendly interfaces are more relevant in lower digital maturity levels.

- **Use of AI/ML** is currently low across all products surveyed, but there was more presence in high digital health maturity markets.

- **Insurance** capability was the least quoted product attribute, relevant only to insurance-related or back-end data aggregation products.

"Level 5 maturity markets have more access to database space and don't have to worry about data compression or other pieces because they have a bigger budgets and less system constraints."

"SaaS is far less desired by governments, but our partners are becoming more supportive. They want someone else to host and push updates"

"Mobile interface required for data input at last mile."

Configurability and interoperability were also highlighted as critical product attributes in lower digital maturity markets

■ The importance of **product configurability** was emphasized, to easily expand function or modules, enable 'drag and drop' solution building and save costs.

■ **Interoperability** was highlighted by providers of backbone data infrastructure platforms as an important enabler for scale.

"If one of goals is to expand, configurability is important for this –whether it is malaria or vaccination. It is important that it is adaptable to save costs."

"[Governments] have such little capacity. [They need] configurable, drag and drop, combined with UI/UX"

"What sets us apart is connectivity – is the network and connects the devices. Not just software, but also the connectivity."

"…having the the know how on interoperability is important"

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