The HISP UiO Business Plan for DHIS2 Core Resources 2016-2021

The Goal of Sustainable National Health Information Systems

Presented by: The Health Information System Program (HISP) at the University of Oslo
BUSINESS PLAN SCOPE AND PURPOSE

Charting the Path Forward

With the explosive demand for District Health Information System – Version 2 (DHIS2) and its growing worldwide impact, the Health Information System Program (HISP) at the University of Oslo (UiO) responds to the current donor community of global health leaders’ request to assess DHIS2’s financial state and project its future needs in human capital and financial resources. This analysis and business plan addresses specific needs related to the core resources required to meet the growing demand, continue to build in-country local capacity, and build and expand the platform.

After conducting a series of interviews and in-depth discussions with the donor base, the HISP regional network and Ministries of Health (MoH), partner Universities and International Non-Governmental Organizations (INGOs) and analyzing resource needs, HISP UiO presents this multi-year business plan. This plan charts the direction of the core resources of DHIS2, its planned future growth and expectations, financial needs, and focus of investment dollars.

ROADMAP TO THE BUSINESS PLAN FOR DHIS2 CORE RESOURCES

→ EXECUTIVE SUMMARY: Summarizes DHIS2 growth, impact and core resources – Pages 2-6
→ SECTION 1: Highlights reasons behind DHIS2’s rise in market growth and areas of global expansion – Pages 7-8
→ SECTION 2: Summarizes HISP UiO’s core resources, related to capacity building, platform development, action-research and in-country local innovation – Pages 9-12
→ SECTION 3: Describes partnerships and communication within the Global Network – Page 13-14
→ SECTION 4: Introduces HISP UiO Senior Management Team and organizational structure – Pages 15-16
→ SECTION 5: Outlines strategic priority areas for DHIS2 – Pages 17-19
→ SECTION 6: Recognizes past funding sources and projects funding models -- Pages 20-22
EXECUTIVE SUMMARY

DHIS2: Positioning for Growth

The growth and impact of DHIS2 has been spectacular. The robust, open-source health information platform has become a global necessity with its implementation in 60 countries. DHIS2 is a product of the Health Information System Program (HISP) research and development movement initiated in 1994 by researchers from the University of Oslo (UiO) and the University of Western Cape, South Africa. **DHIS2 has become the dominant de facto global health information system of record.** It is a platform upon which governments and Ministries of Health (MoHs) across continents are relying upon for analysis, decision-making and investment in the tracking, managing and prevention of disease and pandemics, and for monitoring and evaluation support.

The HISP has doubled capacity over the past 18 months, but that barely keeps up with increased demand. The demand reflects the donor community’s broad funding for DHIS2 implementation in the field that could be at risk if core funds are not sufficient to address demand. **HISP needs to increase its budget as the pace of demand is at risk of surpassing the core’s support capacity.**

Methodically crafted more than a decade ago by pioneering PhD and Master’s students from the Department of Informatics, University of Oslo, this platform has left the largest footprint on the globe for National Health Information Systems (NHIS).

Over the years, the HISP movement thrived and evolved into a diverse and heterogeneous group of entities committed to strengthening public health information systems, including Universities, MoHs, NGOs, social entrepreneurs, individual consultants, and others. The network is built largely on principles of reciprocity, where individual members draw upon the collective good of DHIS2 and associated resources and, in turn, contribute with their individual experiences and technical enhancements.

The challenge ahead for HISP UiO is not primarily of a technical or skills nature, as the HISP network possesses plenty of both. Rather, **the challenge lies in ensuring that the core resources—the functions that maintain and innovate—are adequately funded over time.** There is growing consensus among the donor community that funding for the ‘core’ team is imperative to maintain and grow DHIS2 both in country implementation sites and in its home office at UiO. **Of paramount importance is the attraction of additional funders so the system can continue its pace of tremendous growth—all with the goal of creating sustainable NHIS globally.**

Existing Risks and Mitigation

Significant investment from the University and donor base has provided the funding to create and deliver this global social good. There are key risks associated with both maintaining existing deployments and responding to future demands in terms of volume and increasing diversity of use cases to be supported. To address these risks, we also identified mitigation strategies which are summarized in Exhibit ES-1.
<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current investments by donors and countries will go to waste if they are not maintained and expanded.</td>
<td>Attracting more long-term funders to enhance the portfolio and volume of investments.</td>
</tr>
<tr>
<td>Lose of DHIS2 expertise built over many years to other organizations because of uncertainty of career paths for individuals.</td>
<td>Formalizing employment relationships between UiO and regional HISP groups by transferring the delivery of core services to the regions.</td>
</tr>
<tr>
<td>With expanding user base and number of countries, strong design may be eroded because of the loss of local contact and local innovation.</td>
<td>Establish and strengthen country teams to ensure robust local contact and ability to harmonize different partner solutions.</td>
</tr>
<tr>
<td>Losing DHIS2 technical talent at UiO because of uncertain futures.</td>
<td>Create formal and longer-term career paths for technical team members.</td>
</tr>
<tr>
<td>Uncertainty of DHIS2 clients about HISP groups’ technical competencies and professional integrity.</td>
<td>Establish DHIS2 individual-level certification program and memorandums of understanding with core HISP groups.</td>
</tr>
<tr>
<td>With increasing scale, failure to meet the demand for DHIS2 Academies in both numbers and content.</td>
<td>Expanding numbers and offerings of Academies and strengthening trainers program.</td>
</tr>
<tr>
<td>Fragmentation because of increasing proliferation of technical solutions and diversity of health system needs.</td>
<td>Enhancing platform capabilities of DHIS2 and strengthening interoperability functionalities with other systems.</td>
</tr>
<tr>
<td>Dramatic reduction in PhD scholarships for students from the Global South.</td>
<td>Establish new and innovative mechanisms for PhD scholarships.</td>
</tr>
</tbody>
</table>

**Exhibit ES-1: Risks and Mitigation Strategies**

UiO’s key strategies are to strengthen the core resources to mitigate risks and to invest in the platform to meet growing demand, while actively seeking to increase the levels and types of funding. In addition, funding needs to be secured where possible as a multi-year commitment from donors, so adequate planning can be realized and resource management be effectively employed. UiO’s budget funding for 2016 is estimated at USD 8.2 million. The budget requirement for 2017 is USD 9.6 million. In order to meet the demand for 2020, an annual budget of USD 14 million will be needed.

**The Value of the Open-Source Platform**

The success of DHIS2 is unique and has created a paradigm shift in health information management that its donor community has acknowledged. It has been uniquely constructed through a long-standing participatory action research based approach focusing on experiences from the field and the ground up, which is the most logical and relevant place to define information requirements for decision-making. The platform is open-source, free and unencumbered from license restrictions—which was the “Achilles’ heel” of many health information systems projects in the past. The innovation that occurs on the ground, in-country, is built back into subsequent DHIS2 versions and training—thus enabling dissemination of best practices globally. This drives how the system and the community evolve and share information.

The system’s architects thoughtfully preserve its simplicity and flexibility based on design and development principles of a platform with a low-maintenance philosophy to uniquely address challenges of sustainability and scalability. The platform is based on the latest technology to ensure interoperability with complementary health information systems and mobile applications to enable robust data warehousing to help achieve the key health systems goal of integration. DHIS2 allows and encourages countries to layer in unique applications and add-ons, and to link and tailor to their specific needs. Ownership is local with a core commitment to institutional strengthening. Innovation through the
research and development engine and talent of the UiO and collaborating Universities keeps the platform and the in-country implementation on the cutting edge.

**Leveraging the Regional HISP Network and Growing HISP Movement**

To strengthen the regional and local base in developing countries, the Department of Informatics at UiO has established, coordinates, enables and mentors the broader HISP network. **Strong communities of practice exist throughout Africa and Asia and the HISP movement is emulated and growing.** HISP UiO supports this active and evolving network through the implementation of its PhD and International Master’s Programs, and by supporting the series of Regional DHIS2 Academies that yearly attract hundreds of health professionals and contributes to further strengthen regional and national capacity.

The Academies provide an intensive training program where participants learn by doing; learning about the DHIS2 tools, best practices, new functionality, customization, and advanced use. DHIS2 experts from UiO and the regional groups facilitate these academies including building core content.

In turn, the regional network of HISP groups leverages the platform and augments the mentoring and training at the country level. Countries and users are supported through various online resources and mailing lists, opening up direct channels of communication within the network. This helps to keep the operations transparent, builds understanding of in-country priorities, and enables collaborative processes to build DHIS2 development roadmaps.

DHIS2 is built on a distributed development approach that involves regional and country health authorities, HISP country teams, open-source communities, and educational institutions. **It is the most viable and cost effective platform on which to build specific and unique data collection systems.** DHIS2 is the platform that new donors are examining to pilot their specific health information system-based projects; taking full advantage of its widespread application across the globe and leveraging and contributing to the University environment.

**Benefiting from the University Setting**

With its headquarters at the University of Oslo, **HISP UiO offers a distinct value proposition ensuring that technical advances and local innovation are continuously built into the design of DHIS2**, providing a tremendous return on investment to the donor community.

---

**PSI RELIES ON DHIS2**

PSI is a global health organization dedicated to improving the health of people in the developing world.

During a search for a new, global MIS, PSI selected DHIS2 for its ability to collect, manage and visualize information. DHIS2 is easily integrated with other interfaces and PSI valued how data collection and monitoring can be adapted for all program areas, including referrals, health services, sales and distribution.

After setting up two pilot projects, DHIS2 use expanded at PSI. Since 2013, PSI has more than 20 countries reporting their data using DHIS2 on the production server, and several more are in development. More than 60 PSI countries use DHIS2 to report their monthly aggregated health services data. With this powerful tool program managers make better data-driven decisions that translate into improved programming.
The UiO takes great pride in how, over more than a decade, it has recruited, trained and graduated more than 400 PhD and Master’s candidates, building on collaborations with various Universities in the South. Top-level candidates from the International Master’s Programs in the South have been recruited to earn their PhDs in Oslo with supervision from senior UiO academics. The vision of the UiO program is to build global capacity for establishing and managing curricula and University courses on health information systems and assist governments and local NGOs in strengthening implementations, thus contributing to both research and practice. To date, 45 PhD candidates have graduated and most of them have returned to their home countries, contributing to strengthening implementation and institutional capacities and also supporting local Master’s programs. Many of them have become advocates and users of DHIS2 and, in many instances, occupy key decision-making positions in the Ministries. Many others have established social enterprises back home that become the engines to generate and nurture local innovation while providing meaningful employment opportunities to enthusiastic nationals. Scholarships offered by UiO through Norwegian State funds and support from its donor base brings this talent into the HISP network and offers them a future—inspiring them to make a real difference. The pipeline of talent is, to an extent, self-reinforcing and represents a unique discriminator; it provides a ready supply of passionate, talented and committed advocates of the system with the mission to make a difference in their home countries.

The UiO research approach and methodologies that are intrinsically embedded in the University setting enable the incorporation of state-of-the-art knowledge and lends greater legitimacy to the ongoing technical enhancements to the DHIS2 platform. Research, education, practical systems development, and implementation and use in countries are intricately inter-connected, creating a unique and non-replicable formula. This formula has been continuously improved over two decades of field-level implementation, contributing to the unparalleled global success of DHIS2.

Investing in the Core Resources

HISP UiO has garnered strong multi-year financial support from its current donor base. However, future funding must be directed to the specific needs of the DHIS2 core resources to ensure the ongoing stability, maturity, professional growth and delivery of the development platform. Over time, country needs and demands will necessitate significant increases in funds for these critical core resources. Strategic areas have been identified (Section 5) to support these core resources, including capacity strengthening and platform development, with continued emphasis on participatory action research to catalyze global and in-country local innovation.

Related to capacity strengthening, additional resources will be focused on expanding and strengthening the Regional DHIS2 Academies (including providing additional scholarships), defining and implementing an individual-level certification program, allocating specific resources to the development of DHIS2 Country Teams (DCTs), and continued investments in the PhD and International Master’s Programs—all with the goal of extending research, innovation and impact to serve the local level by strengthening regional and country specific capacities.

With regard to platform development, resource growth will be allocated to investing in and expanding user-support functions and services, leveraging the revolution in mobile devices for collecting and
sharing data, expanding interoperability, continuing to bring technical and programmatic innovations from the field back into the platform for global dissemination.

In Conclusion

UiOs key strategies (Section 5) are to strengthen the core resources to mitigate risks and to invest in the platform to meet growing demand. Critical to this is the contribution of the current donor base and securing of additional future funders. The 2016 budget for core resources is USD 8.2 million and this is forecasted to grow to an annual budget of USD 14 million by 2021. These investments will ultimately contribute to the goal of sustainable NHIS. The time for action to support DHIS2 core resources is now. With increased funding, donors will both protect their past investments and contribute to the building of NHIS globally. Currently, no partners have committed to support HISP UiO beyond 2017.

In late 2012, PEPFAR, NORAD and Global Fund collaborated to become the primary foundation and financial backbone of DHIS2. The leadership by these donor organizations and their shared agreement and commitment to working with HISP UiO was the catalyst for the rapid expansion and subsequent implementation of DHIS2 around the world. Their partnership and financial underpinning led to a major expansion and scale up of DHIS2—now recognized to be global public good benefiting countries, ministries of health and NGOs operating around the world.

A case in point is the PEPFAR story

PEPFAR, with the ambitious aim to reach the 90-90-90 treatment target by 2020 and an AIDS-free generation by 2030, sought an efficient information platform that could baseline and track facility level and global data within a framework capable of scaling up so tens of thousands of facilities and systems could efficiently report their data, which could then be aggregated and utilized by health decision makers. The environment in which PEPFAR operated in four years ago was disjointed, labor intensive and country specific. PEPFAR found in DHIS2 a platform from which to operate most efficiently and effectively.

By 2014, DHIS2 became the underlying technology of the largest software system ever dedicated to ending the AIDS epidemic: PEPFAR’s DATIM information technology project. PEPFAR’s DATIM has implemented HIV/AIDS programs in 70,000 facilities located in 58 countries across the globe. The successful partnership between HISP UiO and PEPFAR was founded on transparent communication, intensive training and targeted system support and guidance. This intensive collaboration unleashed DATIM across the world. Soon, critical information “flew” as all systems were able to report real-time data, simultaneously. With data flowing seamlessly from implementing partners, for the first time PEPFAR had an efficient central repository. Relying on DHIS2, PEPFAR’s data management and reporting changed overnight. The keys to the success:

- All participants share the same preconfigured organizational hierarchy
- Data collection is at the facility level
- GIS coordinates ensure accurate data and enable the capability to target where treatment and counseling occur
- Transparency with regard to where and to whom funding is being allocated gives PEPFAR clear vision and confidence in the progress going forward

PEPFAR’s DATIM program—made possible with the open source DHIS2 platform—is having a profound global impact on the effort to end the AIDS epidemic.
**SECTION 1 – DHIS2 MARKET ANALYSIS, GLOBAL FOOTPRINT AND GROWTH**

DHIS2 has become the preferred tool of choice in 60 countries. It is the national standard in 21 countries and in many Indian states. In addition, PEPFAR is using DHIS2 (renamed DATIM) in 58 countries for reporting by implementing partners and by more than 50 NGOs and 10 global organizations. And the demand continues to grow; an expansion to 20 more countries in Africa and Asia, and in various health program areas in existing countries by 2020 is a conservative estimate. Donors want NHIS to evolve to include new user groups and areas, and expand to gather more granular data at the community and individual level. Responding to such demands from countries already using DHIS2 services represents an enormous potential for growth—as well as our main challenge in the future.

As demand for volume and type of data (aggregate, individual and their interlinkages) has skyrocketed, Ministries of Health now expect access real time and available at the click of a button including through mobile devices. **A global consensus has emerged that an integrated approach is far superior to—and must replace—the traditional siloed systems of vertical programs and individual health projects, which often as pilot projects fade away. This integration is now technically possible with the rapid expansion and falling costs of Internet access makes previously impossible penetration into remote villages and locations now possible.**

**Drivers of DHIS Growth and Impact**

Global demand for DHIS2 is fostered by several key factors:

- The adaptability and customizability of the DHIS2 platform, which can largely be done by in-country expertise not requiring programming skills.
- The participatory design and collaborative philosophy followed in DHIS2 design and development ensures local relevance and strengthens country ownership.
- The platform continues to be modernized and upgraded with quarterly releases in response to the fast evolving needs of NHISs.
- Locally proposed advances and ideas are captured by DHIS2 and then these enhancements are offered and disseminated in system updates that benefit all platform users.
- The Regional and Expert Academies help enable global innovations to be embedded in local contexts and vice-versa.
- The HISP UiO commitment to building and nurturing communities of practice through investments in regional HISP entities and the larger HISP movement more broadly.

HISP UiO enables all these drivers through its activities of platform development, capacity strengthening, research and education, and enabling and strengthening global and regional networks. All these require core DHIS2 resources to be greatly enhanced in the future.
Future Potential for DHIS2 Scaling

DHIS2 scaling can be identified along six key dimensions.

1. **Geographical**: There is rising demand for DHIS2 adoption in new countries. At least 20 new countries in Asia, Africa and Latin America are expected to adopt DHIS2 in the next three years.

2. **Level of Detail of Data**: Most countries start using DHIS2 for aggregated health management data. Thereafter demands for community, household and patient data emerge; thus the systems grow with an order of magnitude.

3. **Programmatic**: Growth is also anticipated on the content side of the platform. Countries initially adopt DHIS2 for basic health information, and energized by its success, seek to expand to other health program related applications. A key future area of growth lies in the “Tracker,” which is expected to support new use domains including disease surveillance, malaria elimination, NCDs, logistics, registries for different diseases, and various others. Success in these new domains will catalyze other health program areas to also adopt DHIS2.

4. **Interoperability**: Building interoperability and integration across systems with DHIS2 is a key priority of countries and in the donor community. The need is apparent as policy makers confront the paucity of quality information to generate cross-cutting indicators drawn from different program areas (such as human resources and routine HMIS); across sectors and domains (such as public and private for malaria eliminations, insurance and health); and for supporting Universal Health Coverage interventions. Enabling these integrations will exponentially scale the functional capacity of DHIS2 and lead to many new applications.

5. **Data Analytics**: As NHIS in many countries mature, the attention of health managers shifts to improving the use of information to strengthen health services delivery and health outcomes. This will require a significant strengthening of the DHIS2 data analytics capabilities, and linking to third-party tools for data visualization, analysis, and dissemination. Harnessing the potential that new social media and big data provides for strengthening global- and national-level monitoring of morbidities and mortalities will be a key future priority.

6. **New Use Domains**: Future applications of DHIS2 beyond the health field are already in evidence, with education and agriculture being in the forefront. The Bangladesh Ministry of Food has deployed DHIS2 as the national system for Food Security and Nutrition. While this business plan does not address domains outside health, there is recognition that the potential in other domains is real and it could be a strategic area of future focus.

This future scaling potential needs to be nurtured and matched with enhanced capacity of the DHIS2 core resources to support it. Academies will need to be expanded by creating specialized ones for Disease Surveillance, HIV, TB, malaria and others while enabling participation of state actors in these Academies through the provision of scholarships. The number of Academies offered annually need to increase to cater to the rising numbers. This expansion, along with designing and implementing an individual-level certification program and reinvigorating the International Master’s Program, will enhance the skill and knowledge exchange among and within the HISP movement, which will support the realization of the scaling potential of DHIS2.
SECTION 2 – STRENGTHENING DHIS2 CORE SERVICES:  
THE HISP UiO MODEL

The HISP UiO model enables activities that are shaped by principles of participatory action research and practices that foster innovation at local (in-country) and global levels. Participatory action research refers to collaborative activities that generate new knowledge by “learning by doing.” Innovation practices are oriented to local actors solving local problems in novel ways and “doing more with less.” Participatory action research coupled with innovation practices contribute to the development of a virtuous cycle, feeding into and feeding off processes of platform development and capacity strengthening. Enabling and nurturing this virtuous cycle is the HISP UiO’s unique recipe contributing to the development of sustainable NHIS. This model is represented in Exhibit 2-1.

HISP MODEL FOR SUSTAINABLE NATIONAL HEALTH INFORMATION SYSTEMS

This model illustrates activities and not organizational divisions as there are overlapping responsibilities among the HISP entities. However, implementing local innovations take place mainly in countries by HISP entities, while platform development and building of core resources for capacity strengthening takes place at UiO.

Capacity Strengthening

Capacity strengthening has two key inter-connected events: in-service training through the DHIS2 Academies and academic education at Master and PhD levels. In addition, HISP UiO prepares and disseminates various resource materials, such as DHIS2 technical documentation and user manuals, and supports country teams to conduct end user training. The various DHIS2 mailing lists for developers, implementers and trainers, coupled with strong community based online technical support, provides another rich source of capacity strengthening activities. The content for Online DHIS2 Academies, currently under development, will help to further scale the capacity strengthening activities.

The DHIS2 Academies were launched in 2011 to meet the rapidly growing demand for training worldwide. Nearly 2,000 participants have attended these Academies to date, and these numbers are...
expected to grow dramatically in the future. The Academies aim to build a community of DHIS2 experts within governments and NGOs in the regions and facilitate sharing of cross-country implementation experiences. Establishing and maintaining the national Health Management Information Systems (HMIS) are core contents of the Academies, while, for example, implementing DHIS Tracker systems for patient data constitutes one of the advanced topics. Work is ongoing to delegate the responsibility for Academies—including development of standard curricula and training material—to regional HISP groups.

Academic education is carried out in Master’s and PhD programs. Master’s programs are in universities in the South (South Africa, Mozambique, Malawi, Tanzania, Ethiopia and Sri Lanka). UiO supported the establishment of these programs through curriculum development and financial support, participation in teaching and supervision of student thesis. Currently, five students from the South also receive scholarships from UiO to study in these programs and 20 UiO students are currently doing DHIS2 related master theses.

The PhD program, until 2015, was supported by the Norwegian government’s quota scheme, which sponsored more than 40 students from collaborating countries in the South for PhD studies at UiO. However, this funding scheme has been abandoned by the Norwegian government, leaving a significant void, requiring the finding of new ways of funding PhD students from the South.

Platform Development

The flexibility of DHIS2 allows it to be adapted to work effectively in varied contexts and use cases. It serves as a crosscutting information platform to support specific work processes and individual cases with the Tracker, as well as monitoring the overall system performance with Dashboards.

The DHIS2 platform architecture consists of a highly configurable core service, an extensive API, and the tools and documentation to support development and customization by a range of users. The API allows for rapid extensions, user interface customization, the ability to pursue various streams in parallel by independent actors, and data exchange with other systems.

Requirements for new versions are collected from the globally dispersed users, and priorities are given to generic improvements, which can have an impact in more than one place. A dedicated team at UiO leads the development and maintenance of the DHIS2 software platform with its browser and Android interfaces. DHIS2 software is developed in quarterly cycles, and each version is released according to a collaboratively developed roadmap. Activities include comprehensive configuration management, system architecture, software design and programming, user support, technical documentation, testing and validation, in-country data set up, population of databases, version control and release management. The team also provides rapid and responsive on-call technical support to the global community of DHIS2 developers, customizers and users.

Participatory Action Research

Two key and interrelated mechanisms—participatory action research and innovation practices—drive and underlie core activities of capacity strengthening and platform development.

Participatory action research represents collaborative activities carried out between developers and researchers together with users and other stakeholders to enable system design, development, capacity strengthening, system testing and more. These activities specifically seek to conduct research by linking
with practice, the goal being to generate new scientific knowledge along with relevant practical knowledge related to system design, development and use.

DHIS2 is the product of a 20-year longitudinal participatory action research project at UiO, which has its origins in the Scandinavian tradition of workplace democracy and South African anti-apartheid activism. This approach, initially applied in South Africa, contributed to both building the NHIS and the first version of DHIS. Since 2000, this approach has been extended and refined as it has been applied in various countries and use settings. This participatory action research informs the HISP UiO capacity strengthening and software platform teams and thus directly impacts the broader development and enhancements of DHIS2. New functionality is tested out in small-scale applications on the ground before being scaled up and, if successful, absorbed, implemented and shared across the generic global platform. In parallel, these important implementation experiences are documented in the academic literature and also shared at practitioner events such as Academies.

At UiO, DHIS2 activities constitute a “living lab” where research, innovation and software development are integrally aligned. Collaboration across and within the broader HISP network, exploration of new use cases (for example disease surveillance) and experimentation with new functionalities and technologies (for example cloud and smartphones) coupled with action research and innovative practices, drives the continuous evolution and dissemination of DHIS2.

HISP UiO generates high quality research outputs through PhD and Master’s candidates. These individuals become critical contributors and leaders of local and regional organizations in the South, supporting and strengthening local capacities. HISP researchers have produced widely cited scientific outputs such as the “networks of action” approach, which has been adopted globally by researchers and practitioners.

Local Innovation

Innovation practices focus on solving problems in context, in novel ways by those experiencing the problems, and by doing “more with less.” HISP UiO seeks to enable in-country innovation relating to DHIS2 use, implementation and capacity strengthening, which then also feed into innovations in platform development at UiO and its global dissemination.

At the country level, mechanisms for enabling innovations are delivered through Academies and local HISP groups.

For example, a dashboard module developed by HISP India after months of intensive engagement with state level users subsequently provided a requirement framework for HISP UiO to design and develop the current Dashboard and Visualizer modules using state-of-the-art technologies. This innovation is now available to the global community as a generic feature. Similarly, engaging with the problem of excessively large numbers of data elements in Tajikistan in 2007, HISP UiO researchers worked on the category-combination option functionality, which is now a core component of the DHIS2. Yet another example is the App for public web portals with HMIS indicators developed by the Tanzanian HISP group. (see Exhibit 2-2).
Enabling local innovation and establishing conscious linkages between local and global processes, is a core objective and also methodology for platform development at HISP UiO. Principles guiding these processes include collaborative engagement, addressing problems of local relevance and generating generic solutions to empower users globally with innovative solutions. This virtuous cycle provides the engine to achieve the goal of sustainable NHIS.
SECTION 3 – PARTNERSHIPS AND COMMUNICATION WITHIN THE GLOBAL NETWORK

DHIS2 is developed and implemented through a series of partners, including MoHs, regional HISP groups, donors, INGOs, private-sector firms, universities and other contributors. Network partners play various roles and contribute at different levels and intersections. Synergies developed through these collaborations have been an integral ingredient to the success of DHIS2 acceptance worldwide. This collaboration and partnerships relationship is depicted in Exhibit 3-1.

Investing in the core resources of DHIS2 will allow HISP UiO to implement expanded collaborative activities across the partnership network. HISP UiO plans for the following endeavors to begin by the end of 2016 and be in fully operational by the end of 2017:

- **The Advisory Board** will be established in 2017, building upon the current global health information leaders’ meeting. The purpose of this Board is to expand dialogue between donors, MoHs and DHIS2 senior leaders, and to collaborate, seek country insights, set priorities, harmonize the roadmap, analyze workloads, and commit to implementation schedules. Each major donor and regional MoH’s representatives will have a seat at the table, as well as senior DHIS2 managers. One senior decision maker will be invited to represent their respective organizations. This small group of influential senior advisors will meet annually.

- **Formalizing HISP collaboration** with MOUs will be established in the latter part of 2016 at a collaborative team meeting. The intent of the MOUs is to standardize relationships with existing core HISP members with whom HISP UiO has long standing relationships, to share values and principles and to detail unique expectations of each partnership and agreement. These MOUs will codify the harmonious working relationship that already exists and be a guiding example for new partners interested in establishing a long-term relationship and commitment with HISP UiO and for the deployment of DHIS2.

- **Hosting HISP requirements and roadmap strategy meetings** is necessary to enhance the strong community network and to understand the unique needs, important insights and contributions of individual regional partners and the countries they operate in.

- **Establishing an individual-level certification program** has been a goal for several years and—with additional donor investment—will become a reality in 2017. Certifications linked to Academies will be one aspect of ensuring local capacity building and building trust of the MoHs in the capacity of the experts they work with. As envisioned, the programs will include levels to certify beginner to advanced DHIS2 expertise. HISP UiO intends to promote and support this endeavor by providing a select number of scholarships to its PhD and Master’s Programs to inspire and mentor the next generation of health information system leaders.

Enhancing and formalizing the methods and modes of communication are warranted as DHIS2 becomes a more mature and expanded global platform. Key to the communication tools delineated above is the continued value of transparency in the priority setting and platform building as demand continues and more countries and programs rely on DHIS2—and the core resources that maintain it.
The HISP UiO Business Plan for DHIS2 Core Resources 2016-2021

Exhibit 3-1: Partner Relationships
SECTION 4 – ORGANIZATIONAL STRUCTURE AND DESCRIPTION OF ROLES AND RESPONSIBILITIES

The HISP network comprises clusters of operation in Africa, Asia and to a lesser extent in Latin America, loosely coordinated by HISP UiO. The success of the enterprise is directly related to the partnerships created, the innovation that emerges from on the ground in-country work, and the financial framework and technical guidance offered by the donor base.

HISP UiO Organization

HISP UiO is based in the Department of Informatics at the University of Oslo. In cooperation with the University of Western Cape, UiO initiated HISP in 1994. Norad funded the initial relationship and remains a steady and robust supporter of HISP UiO and DHIS2 over more than 2 decades. Most recently, PEPFAR, The Global Fund and other INGOs have funded aspects of DHIS2 development and implementation jointly contributing to its current success.

HISP UiO retains a strong senior management team of academic and research talent that collaborates with software specialists in the living lab. This team has lead responsibility for DHIS2 development and implementation, whilst coordinating and collaborating with the global HISP network to build local capacity, train professionals on DHIS2 and inform and convey research and innovation back into the system continuously.

It is critical to appreciate that the HISP UiO mission far exceeds the development of software and its motivating vision is to provide the catalyst for Sustainable NHIS worldwide by supporting countries to build local capacity and strengthen governance towards a sustainable NHIS. HISP UiO seeks to shape the culture of information use by multi-disciplinary (informatics and public health) training of local technologists, decision makers and health managers, as well as contributing to the global body of knowledge through academic research and knowledge sharing.

Nine highly talented and experienced professors and information specialists who work in close collaboration comprise the HISP UiO Senior Management Team. Exhibit 4-1 highlights these individuals and their roles and responsibilities.

Skilled resources that are organized into the following matrixed teams directly support this senior management team:

- **UiO Research**—UiO professors conducting action research, capacity building and supervision of Master and PhD students
- **PhD Students**—actively engaged in DHIS2 implementation in their country or region
- **UiO Capacity-building Staff**—supporting DHIS2 implementation via best practice guidelines, Regional Academies, training and certification programs
- **UiO Platform Team**—DHIS2 software specialists focusing on back-end, front-end Android developers, testers and technical writers
- **UiO Platform External**—DHIS2 software team members working in virtual teams outside UiO but operating under UiO supervision
- **Regional Capacity Building**—implementers and Academy trainers under long-term UiO contracts
- **Regional Temporary Contracts**—implementers and academy trainers under short-term UiO contracts

### HISP UiO Senior Management Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Role Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kristin Braa</td>
<td>Head of HISP UiO, Professor, PhD, more than 15 years of experience in mobile innovation in the global private and academic sectors</td>
</tr>
<tr>
<td>Jørn Braa</td>
<td>Founder of HISP, Professor, PhD, more than 20 years of experience of in-country HIS strengthening, strategy and implementation</td>
</tr>
<tr>
<td>Lars Øverland</td>
<td>Head of DHIS2 software development, MSc, 15 years of experience in software development</td>
</tr>
<tr>
<td>Ola Tittlestad</td>
<td>DHIS2 implementation support coordinator, MSc, 15 years of experience of DHIS2 implementations in the Global South</td>
</tr>
<tr>
<td>Sundeep Sahay</td>
<td>Senior HIS strengthening advisor. Founder of HISP India, Professor, PhD and Master in Public Health, top researcher in ICT4D, more than 20 years of experience of in-country HIS strengthening, strategy and implementation</td>
</tr>
<tr>
<td>Knut Staring</td>
<td>Senior HIS strengthening advisor and partner liaison. PhD, 15 years of experience in DHIS2 implementations in the Global South</td>
</tr>
<tr>
<td>Jens Kaasbøll</td>
<td>Senior capacity building expert and lecturer. Professor, PhD, more than 20 years of experience of in-country HIS capacity building at all levels from DHIS2 users to university programs</td>
</tr>
<tr>
<td>Petter Nielsen</td>
<td>Head of HISP UiO research program, Associate Professor, PhD, 10 years of experience in mobile innovation in the Global South</td>
</tr>
<tr>
<td>Johan Sæbø</td>
<td>Senior HIS advisor. PhD, 15 years of experience of DHIS2 implementations in the Global South</td>
</tr>
</tbody>
</table>

*Exhibit 4-1: Senior Management Team*
SECTION 5 – STRATEGIC DIRECTION OF HISP UiO AND DHIS2

For two decades, HISP UiO has delivered a remarkable product and services with an innovative HISP model for sustainable national HIS within a modest budget. To ensure the ongoing stability, maturity, professional growth and delivery of the development platform and its sustainable use across the world, funding must be directed to the specific needs of the DHIS2 core services of platform development and capacity strengthening coordinated by HISP UiO. This requires HISP UiO to extend its DHIS2 core services across a larger, more distributed organizational structure with intended growth in the regions, including:

- A more distributed platform development process engaging with high quality external software developers who are coordinated by the core platform development team based at UiO.
- Distribution of core responsibilities of capacity building, user community support, requirements-gathering and testing to qualified and dedicated staff based in regional HISP groups.

Future DHIS2 platform development needs to focus on the following key priority areas:

- **Patient Data**—Better support for patient data management and security in DHIS2 Tracker, including support for longitudinal registries for mother and child, disease surveillance and response, and disease specific interventions.
- **Community Level Support**—Support community-based systems and their integration into NHIS.
- **Offline Operation**—Support use of DHIS2 at health facilities and in rural communities where connectivity and power are intermittent through a suite of Android Apps.
- **Data Exchange Standards**. Support countries in establishing harmonized and integrated national health information architectures through offering standards-based interfaces for data exchange between systems.
- **Data Analytics**—Strengthen DHIS2 capabilities in data analytics and integration with third-party software for data visualization, analysis, and dissemination.

Capacity strengthening demand is huge and ever growing. In order to meet the goal of sustainable NHIS, HISP UiO will strengthen the quality and reach of the DHIS2 Academy training programs, establish better processes for sustaining DHIS2 capacity in countries through core country teams, and sustain and further strengthen its longer term Master’s and PhD programs to build future cadre of HIS leaders in the South. Requests for DHIS2 support from countries around the world are straining HISP UiO ability to deliver DHIS2 Academies. With increased funds to support a coordinated effort to scale up DHIS2 capacity, HISP UiO will offer:

- **Regional Academy Teams**—Offer dedicated and qualified core staff at HISP regional groups who possess strong understanding of regional context providing regional DHIS2 Academy courses.
- **DHIS2 Country Teams**—In collaboration with countries and donors, facilitate “DHIS2 country teams” that offer long-term, in-country support to national DHIS2 systems, situated, mentored and trained by HISP regional groups.
• **Scholarship**—Masters and PhDs programs for members of DHIS2 country teams and other HISP groups to create career opportunities and “stickiness” in the network.

• **Expanded DHIS2 Academy Program**—Create more specialized courses and multiple levels, on site and online, to build the DHIS2 country teams and others interested in the software.

• **Master Programs**—Strengthen enrollment of students in existing Master’s programs through provision of scholarships.

• **PhD Graduates**—To become researchers, managers and consultants, in particular in regions speaking French, Spanish, Portuguese, Indonesian, and Mandarin.

• **Action Research Projects and Local Innovation**— Joint projects with regional groups and local universities.

These priority areas will be addressed in direct alignment with an increase in the core resources that are dedicated to designing, upgrading and managing the DHIS2 platform. The core resources of DHIS2—through capacity strengthening, platform development, action research and local innovation—frame the successful implementation, vitality and growth of the enterprise. Ensuring that funders recognize and value this contribution to the whole is critical to the viability of the system’s future expansion and ongoing global impact.

Exhibit 5-1 displays how resources have been allocated and the additional demands anticipated to deliver DHIS2 core services and to implement the strategic initiatives described above.

![Full time Man Years in the HISP Core services](chart)

*Exhibit 5-1: Full Time Man Years to deliver DHIS2 core services coordinated by HISP UiO*
The core resources are allocated as depicted in Exhibit 5-2 with supporting financial information.

2016 Costs for HISP Core staff to deliver HISP Core services

<table>
<thead>
<tr>
<th>Costs 2016 - HISP Core staff</th>
<th>Total 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD 1.6</td>
<td>USD 858 420</td>
</tr>
<tr>
<td>USD 1.4</td>
<td>USD 737 952</td>
</tr>
<tr>
<td>USD 1.2</td>
<td>USD 551 255</td>
</tr>
<tr>
<td>USD 1.0</td>
<td>USD 798 152</td>
</tr>
<tr>
<td>USD 0.8</td>
<td>USD 1 508 178</td>
</tr>
<tr>
<td>USD 0.6</td>
<td>USD 778 553</td>
</tr>
<tr>
<td>USD 0.4</td>
<td>USD 1 035 990</td>
</tr>
<tr>
<td>USD 0.2</td>
<td>USD 533 801</td>
</tr>
<tr>
<td>USD 0.1</td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 5-2: Detailed 2016 HISP Costs

1) UiO Research. UiO permanent staff are Professors doing action research, capacity building and supervising PhD students. The number will be slightly increased from 2016 to 2021 to meet the demand from the increase in the number of PhD students.

2) PhD Students: The PhD students are actively engaged in DHIS2 implementation in their country or region. The number of PhD students from the Global South at UiO between 2011 and 2016 declined due to end of the Norwegian governmental quota program. These scholarships are relatively small (USD 25 000 per year).

3) UiO Administration: The staff responsible for coordination of projects, academies, invoicing and reporting.

4) UiO Capacity Strengthening: The staff support implementation with best practice guidelines, develop and maintain curriculum for the regional Academies, supporting the regional groups to train and certify country teams. The number will be increased in 2021 in order to meet the demand of implementation support.

5) UiO Platform: DHIS2 Software team including back-end, front-end and Android developers, tester and technical writers.

6) UiO Platform external: DHIS2 Software team members working in virtual teams not located at UiO, but operating under UiO supervision. The main growth in the software team from 2016 to 2021 will be in this group.

7) Regional capacity building: Implementers and academy trainers under long term UiO contracts. From 2016 to 2021 will grow by including the regional temporary contract to secure long term and stainable regional support.

8) Regional temporary contract: Implementers and Academy trainers under short term UiO contracts. From 2016 to 2021, we want to move this group into long term contracts, meaning regional capacity building.
SECTION 6 – FINANCIAL NEEDS AND PROJECTIONS

Globally, the reliance on HISP UiO technical expertise is significant and the international development partners are keenly aware that past and future investments in country programs is increasingly interwoven with—and dependent upon—the successful ongoing implementation of this platform. The technical ability to scale up to meet the growing demand for DHIS2 and the financial sustainability to underwrite and support the core resources housed in HISP UiO is the essential business risk facing the donor community.

The Investment Challenge

The opportunity to continue to deliver the DHIS2 platform and to expand its penetration is critically dependent upon HISP UiO’s ability to maintain and scale up appropriately with their core suite of services—the backbone of their global operation.

Similarly, the donor/partner community recognizes that their past and future in-country investments are directly linked to the ability of the core resources to expand and stabilize. Hundreds of millions of investment dollars are potentially at risk should this not occur. Thus, the challenge that presents itself to the donors and UiO partnership is to define the core resource needs, through stronger governance to plan the growth and strategic focus of these resources, and to establish a sustainable financial method and allocation for the continued investment in the core resources within HISP UiO.

Health leaders around the world appreciate and depend on the flexibility and resiliency of DHIS2. The opportunity is boundless, the capability of this platform to support country capacity is unquestioned. The challenge is how to best maintain the financial viability of the core resources to ensure the platform is appropriately managed, expanded and delivered.

Historic Funding Landscape for DHIS2 Core Resources

The funding landscape for DHIS2 has shifted in the past five years. Norad, The Global Fund and PEPFAR entered into a joint agreement to coordinate funding and leverage investments in DHIS2. Through this agreement, Norad continues to support UiO’s core funding needs, including the management team, development of the platform, and some in-country implementation support. The Global Fund currently supports core resources as applied to in-country services only, and PEPFAR supports targeted reporting and informational technology needs. The University of Oslo has also been a strong ongoing supporter. New donors, including UNICEF and WHO, have supported the core resources and HISP programs.

HISP UiO funding is complex and has a long history of balancing incremental donor needs and incremental requirements with product development, market development activities, and academic goals. The best-case scenario is to engage in multi-year core funding commitments, allowing HISP UiO to plan activities and retain a degree of confidence in the continuity of the donor community support.

The DHIS2 Team has strong financial and institutional integrity with regard to accepting, tracking and allocating funds donors have invested in and provided to HISP UiO. Exhibit 6-1 summarizes historic funding by partner over the last several years.

The investment and trust that the current donors have given is greatly appreciated. HISP UiO is also eager and prepared to engage with new partners to build new long-term relationships and alliances. The
current donor group, and those that will entertain future investment, will be welcomed to participate on the DHIS2 Advisory Board, which will have the mandate to set priorities and plan for future implementation of the global enterprise.

Future Projections across Donor Base

HISP UiO values the contribution of the current donor base and the advice and guidance that each provides. HISP UiO recognizes funding constraints and understands some organizations, based on their charters, cannot easily allocate multi-year funding. However, from a planning perspective, HISP UiO has projected funding across the current donor base and has made the assumption that over time new donors will join this Global Health Leadership Advisory Board, making significant contributions to the DHIS2 core resource need and the long-term goal of Sustainable NHIS. Currently, no partners have committed to support HISP UiO beyond 2017.

Exhibit 6-2 presents a prospective scenario that HISP UiO has developed to forecast funding that ensures resources are available to meet the growing need of DHIS2 and to underwrite the resources required to continue to develop, enhance, and maintain the system platform—as well as the continued need for training, capacity building and outreach among the HISP network and growing HISP movement.
HISP UiO acknowledges and appreciates that each donor has its own portfolio of programmatic needs and investment outlooks. However, the direct request is that all donors allocate a percentage of their in-country expenditures directly to the core DHIS2 resources to continue the viability and development of the system platform, upon which their in-country investment relies.

Several models are proposed for donors to consider as part of this scenario of core support:

- **Model A: Direct Support**—Donors supporting the entire application resiliency, funding directly to address ongoing core resource needs.

- **Model B: Percentage Allocation**—A percentage of the total dollar investment a donor makes in its global health care investment is allocated to the DHIS2 core resources to protect and ensure continuity of DHIS2.

- **Model C: Supplemental Allocation**—A modification of Model B, but offers a donor’s percentage contribution to the core by, in addition, supporting a particular core resource activity (e.g., testers or the Academies).

- **Model D: Target Allocation**—Donor’s prerogative to fund a specific core resource activity to augment their particular program implementation.

DHIS2 is a product of social good, one in which each partner can be proud of the key role they can play in its growth and the evolution of its mission to meet the critical needs of global health programs and countries.

UiO envisions that each donor, based upon its strategic direction and available funding, will select the model that best reflects their goals and protects the investment they have already made in global health.