IHS Markit® | Stonehaven Consulting

Agribusiness | Animal Pharm

Growth Drivers 2020 to 2030

How Animal Care Industry Leaders are Working to Drive Growth using Transformational Technologies and Trends

Contents

List of Figures

List of Tables

Executive Summary

Dear Reader,

The quest for innovation in the animal health industry has been accelerating tremendously over the past several years as the leading companies in animal care develop strategies to offset the maturation of their product portfolios while working to diversify the ways they offer complete health solutions to veterinarians, livestock producers, aquaculture professionals, and pet owners.

This report, titled *Animal Pharm | Stonehaven – Growth Drivers 2020 to 2030*, will summarize the forces that have led to an increased emphasis on new approaches to accessing innovative products and technologies via partnerships, collaborations, acquisitions, or other means. It will also dive into a number of potentially transformational technologies and trends that hold promise for driving the growth of the animal care industry over the next decade.

The information presented here builds on last year's popular *Animal Pharm* report, *The New World of Innovation in Animal Care*, which introduced the concept of how the top companies in animal care have begun to converge technologies in animal nutrition, diagnostics, vaccines, and therapeutics in their ongoing effort to generate dynamic growth for their overall businesses.

It is important to note that this report was researched, developed, and written prior to the emergence and the known scope of the COVID-19 crisis. As such, an introductory "chapter zero" has been added to the report to acknowledge the many implications that have become apparent for the animal care industry due to the virus.

The added chapter attempts to outline several short-term, mid-term, and longer-term effects that have the potential to fundamentally alter various aspects of the animal care ecosystem for certain stakeholders throughout both the companion animal and farm animal sectors. Readers are encouraged to take into account the ongoing evolution of the COVID-19 scenarios as the dynamics change over time.

However, the basic premise of this report – that the animal care industry will continue working to drive growth in the coming decade by endeavoring to leverage transformational technologies and trends – has ongoing relevance and remains an important element for industry growth. The remainder of this summary describes why this is the case.

Most importantly, as company growth strategies have shifted to include a significant emphasis on external opportunities to supplement internal development, the increase in demand for external innovation has been dramatic. The availability of new technologies in animal care and a proliferation of partnership opportunities in recent years have rapidly expanded the sources of innovation for the industry's leading competitors. At present, virtually all of the top players are proactively inviting collaborations with related industries and with startup companies to potentially create synergies with their current, core research programs.

This report will outline why the need for external innovation in the animal care space is growing, and it will detail several areas that are accelerating the move toward leveraging external opportunities. For decades, consolidation has

been a huge avenue for climbing the industry rankings in terms of sheer size, and consolidation will continue to be a large factor in that quest. Today, however, industry elements like the emergence of an exciting startup company ecosystem, strategic moves into adjacent and synergistic market areas, and increasing investments in an evolving biotechnology sector are adding significantly to the ways companies are working to maximize the value they bring to customers.

Future sources of innovation and growth are likely to continue leveraging multiple strategies. While the animal care industry still has a number of smaller firms that represent potential acquisition targets, the number of these companies that are of a size that would bring immediate sales and profits to industry leaders is not large. Hence, the increased interest in translating innovation from the human health field into animal care; acquiring technology through startups; developing partnerships/collaborations/licenses that provide synergy with existing portfolios; capitalizing on the Internet of Things (IOT) and related digital opportunities; and looking at adjacent areas to the traditional animal care area, including nutrition, diagnostics, and medical devices.

Animal Pharm | Stonehaven – Growth Drivers 2020 to 2030 will work to describe the new animal care industry that is emerging as a result of the broader view companies are taking in their research and development programs and in the ways they are defining and addressing their customer bases in the various market segments where they compete. The major takeaways from this report will be that the potential benefits of investing in the animal care market today have never been stronger, and that the related potential breakthroughs in animal medicine have never been more exciting.

The report is organized into chapters intended to outline the evolution of the traditional animal health industry to what is now being described as the animal care industry. Ultimately, it will identify and describe several trends and various technologies that are expected to drive the growth of the animal care industry over the next decade.

The first section is an overview the animal care market that developed as a result of the decades of consolidation that has taken place throughout the industry and the move toward adjacent and synergistic market segments such as nutrition, diagnostics, and digital technologies. This section includes a particular focus on the latest large transaction to be announced in the form of Elanco's pending acquisition of Bayer's animal health business. Following that description of the market and its opportunities, a handful of high potential areas of focus are highlighted, including:

- Nutrition and diagnostics, with emphasis on how some of the major competitors in animal care are finding and capitalizing on the synergies these industry segments bring to their core businesses;
- The digital revolution, including digital technologies/wearables, as well as their place in the animal care segment;
- The role of data and artificial intelligence in the animal care market;
- How classical innovation will continue to grow and prosper as the central mechanism for meeting unmet medical needs in animal health; and,
- The human health/animal health crossover, including technologies like cell and gene therapy and precision medicine.

Finally, the last section of this report describes how he startup company investment ecosystem and its role in bringing new technologies to the forefront of animal care – in addition to the ongoing investments in all of these technologies, trends, and factors – will support the animal care market's evolution over the next decade.

AnimalhealthEurope and the US Animal Health Institute also commented, both noting that member companies were taking all precautionary measures to ensure the health and safety of our people and their families, while also staying in contact with regulatory agencies in regard to production challenges.

As the adoption of policies supporting the essential nature of the veterinary business were put into place, industry experts, investment banks, and analysts noted that the animal care industry would face extraordinary challenges throughout the situation created by COVID-19. That reality, along with optimism about recovery and an eventual return to a more predictable commercial environment, led to relatively consistent outlook reports from industry watchers regarding the future scenarios for companies competing in the animal care market.

0.2 Experts point to resilience across the animal care sector

In an April 2020 Animal Health Investment webinar sponsored by Kisaco Research titled, "Opportunities in Animal Health in the Age of COVID-19," presenters pointed to the way the animal care industry weathered the financial crisis of 2008-2009 as proof that the animal health industry as a whole is relatively recession resistant when compared to sectors of the general economy. Experts on the panel landed on the term "resilient" to describe the way the industry is currently absorbing the economic punches being delivered by the widespread shutdown of normal societal activities.

McKinsey presenters pointed out in the session that while they expect the economic impact of the COVID-19 challenge to go on for some time, the speed of the rebound will differ based on geographies and species. At present, they said, the industry should be prepared for a two- to three-year period of uncertainty.

Calling the future reality "the next normal," they believe that strong food purchase trends will help the agricultural and livestock sectors recover faster than other industries during the crisis and beyond. In addition, they expressed confidence that any decline in pet care expenditures by pet owners would be nowhere near the decline in other consumer spending categories during this challenging period.

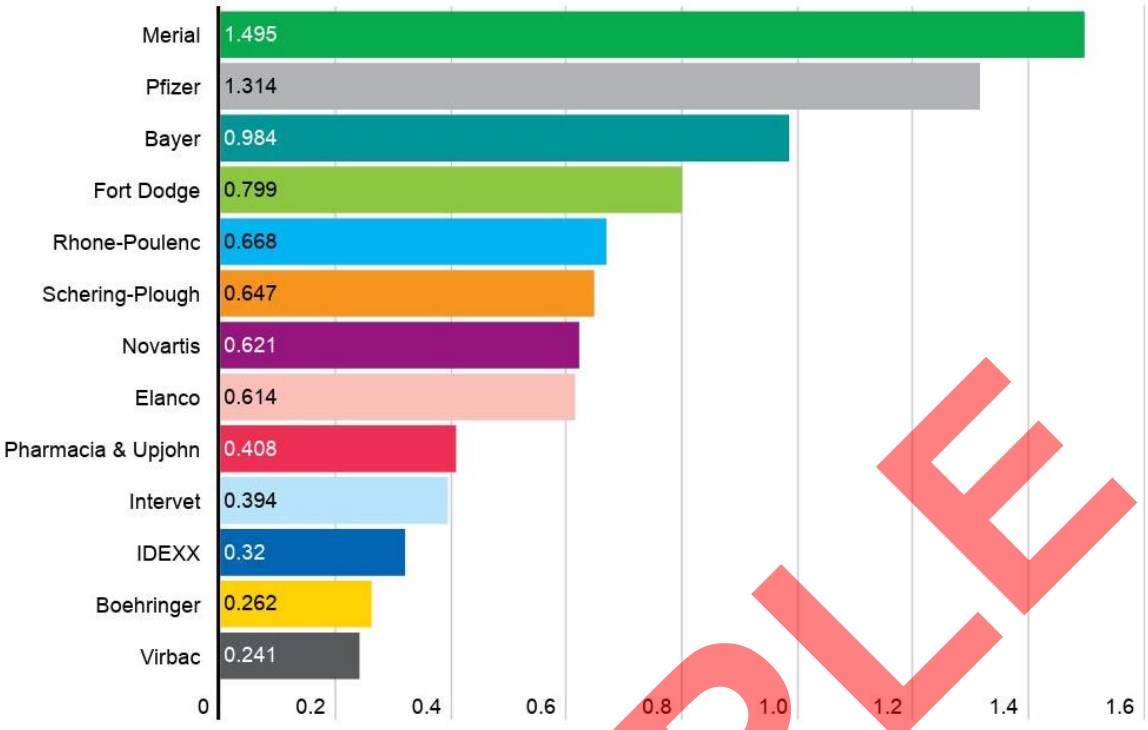
During the webinar, it was also stated that companies would be well advised to maintain investment in innovation during the current crisis in order to solidify foundations for future growth. Kathy Turner, Corporate Vice President and Chief Marketing Officer for IDEXX, echoed that sentiment:

> "Continuing to invest in R&D is going to be critical. R&D and innovation are really at the core of what we do as a company. We will continue to focus our R&D efforts on unmet clinical needs."

Ms Turner also noted a number of observations leading to IDEXX's long-term belief in strengthened growth drivers already at work in the companion animal sector, including significant increases in pet adoptions and fostering during the COVID-19 stay-at-home period; even stronger elements of the human/pet bond thanks in part to the work-from-home dynamic; and the increased importance of the aspects of "comfort" as they relate to people keeping pets.

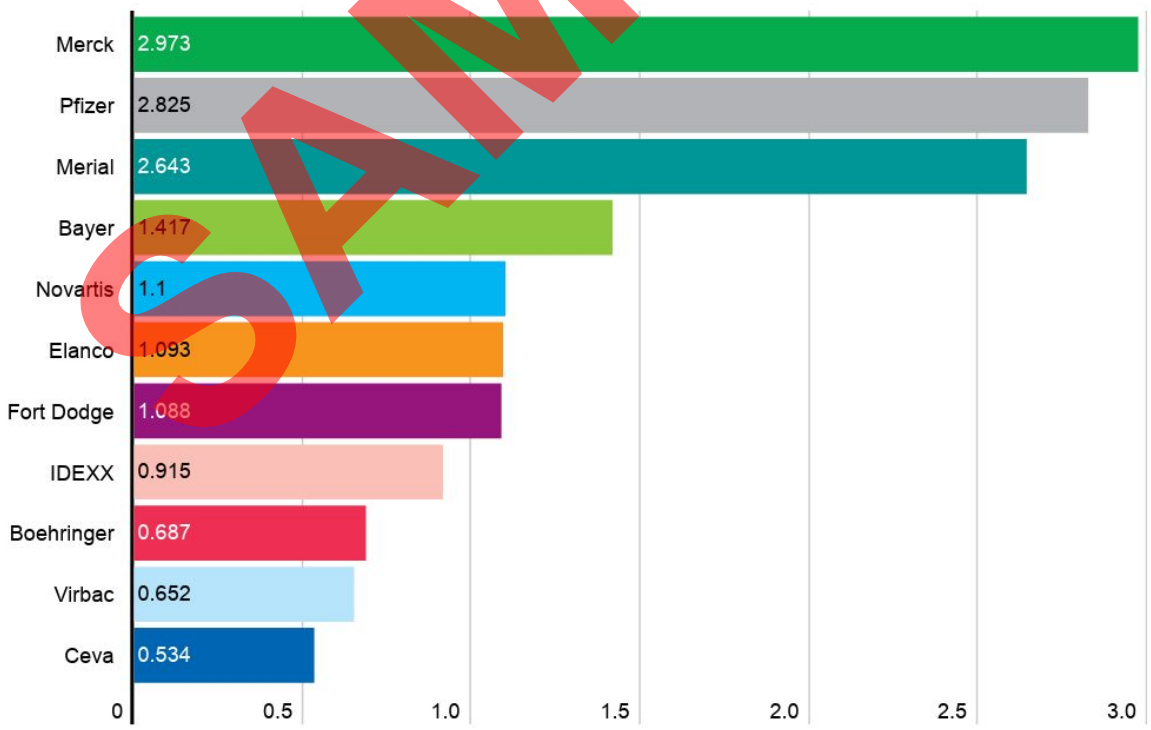
Rob Kelly, Executive Vice President and President, International Operations for Zoetis, maintained that in the long term, the animal care sector remains a great place for investment.

Figure 1: Top Animal Health Companies 1998 ($bn)



Source: IHS Markit Animal Pharm

Figure 2: Top Animal Health Companies 2008 ($bn)



Source: IHS Markit Animal Pharm

In the future, Mr. Schacht noted, the animal health industry will see dedicated investors in new technology companies, leading to even more opportunities for the development of innovative solutions.

1.3.2. The significance of an evolving innovation ecosystem

Significantly, the entire animal health industry is experiencing a rapidly evolving innovation ecosystem that is disrupting traditional thinking around where innovation can be sourced. Internal research & development, business development, in-licensing, venture capital-backed startups, and any additional source that is applying novel technologies offers an avenue to innovation, leading to a faster and more agile approach to developing and acquiring innovation across the industry.

On top of that, recently published industry reports and comprehensive news articles have defined how the top companies in animal health are working to take advantage of a convergence of technologies in areas like animal nutrition, diagnostics, vaccines, and therapeutics in their ongoing effort to generate dynamic growth for their overall businesses.

As described in a recent *Animal Pharm* report titled, *"The New World of Innovation in Animal Care,"* the major players in animal health are increasingly combining their knowledge bases in traditional animal medicine with areas like diagnostics, nutrition, precision medicine, digital approaches, and "big data" analysis to discover new and often integrated approaches to keeping animals healthy.

That report not only highlighted the increasing availability of new technologies and partnership opportunities which expanded the sources of innovation for the leading competitors in animal care; it also outlined how the innovation ecosystem in general had evolved up to that point. Today, with virtually all companies actively inviting collaborations with related industries and with startup companies, their ability to create synergies with their core internal research activities is greatly expanding the scope of integrated health solutions they can potentially bring to livestock producers, veterinarians, and pet owners.

As Zoetis CEO Kristin Peck told *Animal Pharm* in early March, innovative approaches like digital technologies, genetics, and diagnostics, for example, may represent a small amount of revenues now, but in the near future they will be critical in boosting the firm's total performance.

> "I believe the future of Zoetis and the core of our growth will be innovation in vaccines, monoclonal antibodies and medicines, but maximizing that value is going to require diagnostics," Ms Peck said. "It's going to need genetics to raise the right type of animal that has the least likelihood of getting a disease. We are looking at solutions that go across the continuum. I want to sell a customer journey."

Zoetis has been building and broadening its capabilities over recent years through acquisitions and partnerships, working to provide customers with solution-based approaches ranging from disease prediction to detection, prevention, and treatment.

1.5. Integrated solutions

The model promoted by Zoetis provides a good picture of what an integrated approach to animal care might look like in terms of keeping animals healthy. It involves an integrated business model offering customers a comprehensive portfolio of products and services, which the company believes can not only create significant value for customers, but position Zoetis among the few companies with both the scale and scope to potentially be a "one stop shop" for animal health solutions.

This approach is clearly articulated in the Zoetis definition of the "continuum of veterinary care," where the company outlines its "predict, prevent, detect and treat" model. For example, Zoetis offers genetic markers to predict disease, vaccines and biodevices to prevent disease, diagnostics, devices and analytics to detect disease, and medicines and therapeutics to treat disease.

These elements, according to Zoetis, are all necessary to improve the productivity of livestock and to improve the quality of life in companion animals. The objective of the future will be to use the data from things like genetic markers, biodevices and diagnostics and translate the data into information upon which customers can base decisions. Their model is illustrated in the graphic below, bringing all of the veterinary solutions to the table in their program.

Figure 7: Zoetis – Continuum of Care (infographic)

Source: Graphic provided courtesy of Zoetis, inc.

According to Merck Animal Health president Rick DeLuca at the time, the transformative technology around animal identification, monitoring and data management was expected to play an increasingly important role in animal health and care. He stated that the company believed that the technology was highly synergistic with the Merck product line and that it represented yet another way the company would ensure its place as a leader in animal health by bringing innovative, technological solutions to its existing and new customers.

Parallel with the point above related to the Zoetis purchase of Abaxis, Merck's existing scale and portfolio breadth will very likely allow the Antelliq technology to flourish even more. Despite having the same target customers from livestock and aquaculture managers to veterinarians, nutritionists, and pet owners, the companies had complementary portfolios with little to no overlap.

2.1.3. Vetoquinol acquires majority interest in FarmVet Systems

The purchase by the French firm Vetoquinol of a majority stake in FarmVet Systems is another example of the trend toward top animal health firms making acquisitions that offer synergies with their core animal care solutions. In this case, Vetoquinol acted on its vision of improving animal health and welfare by creating an ecosystem where digital technologies and diagnostic tools work along with their animal drug portfolio to help veterinarians optimize their care decisions.

FarmVet created a cloud database called VetImpress for use by veterinarians that provided insight to support their health management decisions on cattle farms. Each farm generates a volume of data derived from biological analyses, performance statistics, and other sources, and the data is collated on a single dashboard that allows veterinarians and producers to share information and transform it into an on-the-farm decision making tool.

Veterinarians can link to the platform through web portals. FarmImpress, an extension of VetImpress, allows farmers to see data and insights about their animals through an app.

VetImpress was sold by FarmVet in the United Kingdom and Ireland. At the time of the acquisition, Vetoquinol planned to make it available to veterinarians worldwide through is international operations, demonstrating a significant avenue to drive growth by investing in adjacent businesses and technologies.

2.2 Animal care market fundamentals strong and stable

The fundamentals of the animal care market are unique in ways that make them an attractive area for investment. On the livestock side of the equation, a combination of population growth, rising incomes, and urbanization, according to the World Health Organization, have generated an enormous surge in per capita meat consumption over the past 20 years. This is a trend expected to continue. In spite of projections around plant-based and cell-based meats and protein alternatives becoming a $140 billion industry in the future, according to Business Insider, animal-based protein products will remain essential to meeting global needs.

On the pet side, many factors are driving robust growth. The rate of pet ownership is seeing annual growth worldwide, and the people who own pets increasingly view their companion animals as family members. Growth in pet spending in developing markets, advances in animal health care treatments, increased medicalization rates, and

spraying/monitoring, irrigation, and crop health assessment to improve productivity. Self driving tractors, seed planting rate controllers, fertilizer and pesticide controllers, and other such technology are also now commonplace.

Successful examples of benefits from digitalization abound in both livestock and pet health, as well. Telehealth, trackers, wearables that monitor vital health signs, implantable devices, artificial intelligence, and what is called "Big Data" are becoming more prevalent and have the potential to provide the animal health and veterinary industry with opportunities to improve animal health outcomes.

According to a report published by Grandview Research that included both the animal health and crop protection elements of what they call "agri-tech" or "smart agriculture and farming," these segments were valued at around $5.8 billion USD in 2016 and are expected to grow more than 200% over the period extending to 2025. Notable areas mentioned in the report related to livestock were milk production, breeding and feeding management, and animal movement and comfort.

Grandview Research said in a separate 2018 report that the global market for pet wearables alone was estimated to be $1.4 billion, including technologies that used Global Positioning System (GPS) trackers, RFID sensors, motion sensors, cameras, antennas, and transmitters to monitor pet health. These devices allow the monitoring of animal movement as well as the measurement of biomechanical and physiological systems. Grandview said the identification and tracking application segment is expected to dominate growth of the digital space in pet care over the next several years.

3.1.1. Digital innovation for livestock

In livestock production, traceability of livestock has boomed with the introduction of identifications systems, and now there are many management tools available that go far beyond tracking and identification, thanks to technology advances. Examples are many at the present time, while growing at a rapid clip.

Boehringer Ingelheim and Soundtalks. In the first half of 2019, Boehringer Ingelheim announced that it had acquired a minority stake in the Belgian company SoundTalks, with a goal of using digital innovation and technology to detect the presence of respiratory disease in pigs using a high-tech digital microphone system. The SoundTalks system revolves around a digital microphone that records pigs coughing. It relies on an algorithm to differentiate coughing from other sounds in a pig barn and detects increased coughing that could signal respiratory distress. The system lets farmers and veterinarians intervene more quickly to obtain samples and get a diagnosis. Boehringer Ingelheim planned to install the SoundTalks system in select pig barns in the US and other major swine markets in a pilot program and has hopes to test the technology in areas including poultry and aquaculture.

Merck and Antelliq. Merck completed its acquisition of Antelliq in the first half of 2019, as noted earlier in this report. At the time, Merck called digital technology "the fastest growing part of the animal health industry" and it is noteworthy that Merck invested more than $2 billion to acquire all outstanding Antelliq shares. Antelliq is described as one of the most-developed companies in the areas of digital animal identification, traceability, and monitoring. The company has a range of digitally connected identification and monitoring products that provide access to information and data in real time, allowing livestock producers and veterinarians to help improve health outcomes. Antelliq has been a pioneer of monitoring solutions that deliver smart data products for the management and wellbeing of

rates continue to grow in the US companion animal market and as markets outside the US, including Brazil, China and throughout Europe, continue to increase their rates of care.

Abaxis was acquired by Zoetis in a deal announced in mid-May of 2018 that subsequently closed on July 31, 2018. The transaction was significant for Zoetis, strengthening the company's position in the diagnostics market and making it the second largest competitor in the market.

Abaxis, with its VetScan family of diagnostic instruments, brought Zoetis a proven, competitive platform for growth in diagnostics. By leveraging its global scale and direct customer relationships in approximately 45 countries, Abaxis is working to accelerate its growth in the U.S. and worldwide, and to further its role in Zoetis' "continuum of care" involving disease prediction, prevention, detection, and treatment.

Zoetis has long indicated its interest in enlarging its presence in the diagnostics market, as evidenced by its purchase of Scandinavian Micro Biodevices (SMB) in 2017. Between its former diagnostic capabilities purchased from Abbott in 2014, its purchase of SMB and now its acquisition of Abaxis, Zoetis has another avenue of fueling organic growth.

Abaxis itself entered the veterinary market in 1995 with the introduction of the VetScan analyzer. The current VetScan VS2 is a chemistry, electrolyte, immunoassay and blood gas analyzer that uses blood samples to perform multi-chemistry blood analysis. The analyzers use consumables packaged as single-use reagent discs, and the company offers 13 multi-test reagents.

Abaxis also markets and sells VetScan hematology instruments and related consumable tests in the veterinary market, as well as rapid tests and specialty analyzers and consumables. Of interest is the fact that the specialty analyzers and related consumables sold by Abaxis were sourced from Scandinavian Micro Biodevices, a company which as noted was bought by Zoetis in 2017.

Although Abaxis' veterinary offering is heavily focused on pets, Zoetis sees a time when a portfolio of equipment at the point of care will help veterinarians and producers make faster health decisions in terms of diagnosis and treatment that will improve livestock productivity. Zoetis also believes the potential to leverage their expertise in livestock will fuel the point of care growth both inside and outside the US.

While IDEXX Laboratories is the clear leader in the veterinary diagnostics space, Zoetis believes it can become a worthy competitor by leveraging a range of assets. Zoetis also intends to harness its broad portfolio of vaccines, services and technologies as a way of supporting its diagnostics business – something players focused solely on diagnostics are unable to do.

Heska is a specialist in companion animal diagnostics and for most of its history had the majority of its competitive presence in North America. Three recent acquisitions – involving Germanym-based scil animal care, the Spanish firm CVM, and the French endoscopy specialist Optomed – have begun to expand the company's focus in several European countries.

This series of acquisitions will support Heska's efforts to build critical mass outside North America. Notably, the acquisition of scil animal care company Canada began with a 2015 distribution agreement where scil would market and promote Heska's full line of hematology, blood gas & electrolytes, and chemistry instruments and affiliated

Livestock breeding strategies and genetics science advances over the years have allowed producers to more effectively and efficiently identify superior animals earlier, potentially improving selection and breeding overall. With market growth for livestock genetics largely driven by factors covered earlier in this report around the ongoing increase in consumption of animal protein due to population growth and the need for more efficient animal production, the genetics area will continue to be a contributor to the animal health innovation spectrum.

According to the National Institute of Food and Agriculture (NIFA) in the US, animals and livestock contribute 40% of the global value of agricultural output and contribute to the livelihoods and food security of almost a billion people worldwide. Advances in animal breeding, genetics, and genomics are credited with improvements in attributes like feed efficiency, which has led to increases in production of beef and milk while utilizing fewer cattle. This kind of boost is largely possible thanks to genetic advances critical to improving livestock production and lowering costs.

According to NIFA, today's research initiatives are making advances in areas such as sequencing animal genomes to imnprove health, adaptability, and production; improving adaptability of animals to climate change and disease; improving livestock breeds to allow greater feed efficiency and other desirable traits; and, developing DNA-based technology to predict genetic merit for traits.

While there is also excitement and optimism about where genetics and genetic testing science will be applied in companion animals in the future, the field is significantly different than the livestock genetics area. DNA profiling tests that verify parentage and genetic identity are available, as are a number of specific breed profiles and individual genetic tests. For now, the hope is that in the near future, genetic testing will allow identifying dogs at high risk of developing serious conditions or certain cancers, allowing veterinarians and pet owners to intervene early and optimize their pets' quality of life.

Recent research by The Roslin Institute in Edinburgh, Scotland, discovered that a DNA mutation in a specific gene is linked to breathing issues in certain popular dog breeds. According to Roslin, the finding could help in developing future tests that assist in identifying at-risk animals and enable pet breeders to improve their selection. This is one of the many avenues through which genetics will become more important in the companion animal sector.

The leading companies in the livestock genetics sector are focused on genetics products and genetics services. ABS Global/Genus Breeding, and Germany-based EW Group are leaders in the products area, while Zoetis and Neogen are significant players in services. Ongoing advancements in developing disease resistant animals and improving genetic technologies such as artificial insemination, embryo transfer, and sexed semen will drive ongoing growth, as will DNA tests for genomic profiling and animal selection optimization.

Genus ABS. The bovine business of Genus, called Genus ABS, is the largest cattle breeding business globally and directly operates in 20 countries while working through representatives in 60 more. Genus PIC operates in the porcine sector and is the international leader in providing genetically superior pig breeding stock to commercial pork producers. Genus is a leader in the animal genetics industry in pursuing innovative solutions in the fight against animal disease and suffering, including the use of data and health-focused breeding indices. The company also explores use of new technologies, including gene editing, which could have a significant impact on farming and animal well-being.

In mid-2019, Genus announced that it was collaborating on a project to develop and market virus-resistant pigs in China, which is the world's largest market for pork. Genus planned to work to integrate its PIC genetics into Bejng

3.6.1. Pet therapuetics

The future of veterinary medicine in companion animals will involve a focus on several different areas of pet health as pet ownership continues to increase in developed markets and people spend more and more to keep pets healthy. Dermatology, cancer, pain management, diagnostics, and data-driven diagnoses will continue to attract investment, as well as conditions that represent currently unmet medical needs.

Atopic dermatitis. An excellent example of breakthrough innovation that has driven growth in a pet health category in the past half decade is in the treatment of atopic dermatitis in dogs and cats. This disease involves a genetically predisposed allergic skin disease in pets and is usually described in the form of an itchy animal that rubs, bites, licks, and scratches as it deals with discomfort.

With atopic dermatitis, an allergic reaction occurs when an animal breathes allergens like pollen and house dust, or if it ingests a substance to which they are sensitive. The allergic reaction causes the animal to lick, bite and scratch until pruritic conditions result, causing extreme discomfort for the animal and serious concern for pet owners. The chronic nature of atopic dermatitis, along with often severe symptoms, often make it a lifelong challenge for pets, their owners, and veterinarians.

A pair of breakthrough products introduced in the recent past have been instrumental both in building a larger market for dermatological solutions and for significantly relieving pets' and pet owners' frustration with the disease and its effects. One was the introduction of Apoquel (oclacitinib), which received US approval in June 2013 and, more recently, Cytopoint, a monoclonal antibody that received USDA approval at the end of 2016.

Both Apoquel, dosed as a tablet, and Cytopoint, which is a subcutaneous injection, have rapid onset and reduce itching within 24 hours. Thus, with only a few months of oral medication or a few injections, a pet with short-season atopy will be well-controlled for the duration of its symptoms.

Pain management. Another example of a pet health market that has seen significant growth over time is in pain management for dogs and cats. Osteoarthritis is a condition where cartilage breaks down over time, causing bones to rub against one another. This rubbing can permanently damage the joint and cause pain, inflammation, and lameness. Drugs to treat pain, primarily non-steroidal anti-inflammatory drugs known as NSAIDs, have been seeing continual improvement in effectiveness over time.

The newest active ingredient in the NSAID class is Galliprant (grapiprant tablets), which was first introduced in 2016. Galliprant is in the NSAID class but is said to work at a slightly different point on the inflammatory pathway and is safe for daily use in the form of a flavored, chewable tablet.

Monoclonal antibodies hold promise as a next generation tool in pain management. Zoetis' recent acquisition of Nexvet Biopharma brought a pipeline candidate that, if successfully registered, would become the companion animal industry's first monoclonal antibody therapy administered monthly by injection for chronic pain. Nexvet was also developing a monoclonal antibody to treat chronic pain associated with osteoarthritis in cats. Feline treatments for pain are limited, and monoclonal antibodies could open up a new opportunity in feline pain that is underserved today.

seeks partners with allied businesses, universities, biotech companies and research institutions. We also collaborate closely with our colleagues in MSD Human Health to share best practices and leverage the power of our combined research efforts."

In many ways, the current state of innovation and productivity in the animal health sector parallels that of the biopharma industry more than a decade ago. At that time, as pharmaceutical R&D productivity was declining, companies started to externalize R&D programs to a greater degree in an effort to capitalize on the opportunities that could be found in partnerships, collaborations, and licensing.

4.1 Emergence of investment funds in animal care

One of the ways the pharmaceutical companies addressed issues around gaining access to promising technologies or programs was by creating venture arms in hopes that they would enhance the number of opportunities they might have to gain access to assets that would complement their own portfolios. Animal health and related companies have been active in this area of investment, as well, and a number of these initiatives are already well established.

Some of these funds exist within the structures of companies whose core business is in the animal health and animal care areas, while others are purely venture firms investing in the animal care space, among others. The types of venture arms and funds are categorized below, including some examples of key players.

4.4.1 Venture Capital Funds

Venture Capital Funds represent investors who seek private equity stakes in startup and small- to medium-sized enterprises with strong growth potential, most of which are characterized as high-risk/high-return opportunities. Venture capital funds are usually active in their investments, providing management guidance and often holding a board seat.

Anterra Capital. Anterra Capital operates offices in Amsterdam, Boston, and London, with a goal of backing entrepreneurs who are making a positive impact in global health and nutrition. Anterra was established in 2013 as a spin-out of Rabobank's proprietary funds group and created its food and agriculture technology fund as an independent venture capital fund in the agriculture and food technology sector. In February, Anterra participated in the funding of Invetx, a startup working on a biotechnology platform for protein-based therapeutics in animal health.

Seventure. Seventure Partners was established in 1997 and funds innovative companies in the areas of digital technologies and life sciences. Its latest deal in the animal health sector was being among the investor group in NovoBind Livestock Therapeutics Inc. a Vancouver-based animal health biologics business. NovoBind works to develop precision biologics to protect livestock against pathogenic bacteria, viruses, and parasites.

Mountain Group Partners. MGP invests in and helps manage transformational businesses in the life sciences, agricultural technology and general technology sectors. Founded in 2002, MGP invests in seed and early stage companies, and its agricultural technology investments focus on disruptive technologies in animal health and agriculture. A significant animal health investment was completed in 2019 with the funding (along with Merck Animal