

Oaklins

M&A MARKET REPORT

Internet of Things

October 2019





JAN P. HATJE

Managing Partner

Oaklins Germany, Hamburg

j.hatje@de.oaklins.com

+49 40 349 14 175



CARSTEN WAGENER

Associate Director

Oaklins Germany, Hamburg

c.wagener@de.oaklins.com

+49 40 349 14 154

Dear Valued Reader

The entire IT industry is benefiting from the rapid pace of technological development. Gradually, our entire lives are being digitized, which creates completely new challenges for companies in all branches of industry. Customers today already expect continuous availability of information. These can only be provided reliably via solutions that not only record data, but also process it in to order display or use it to make decisions. At the same time, the underlying infrastructure must meet the new technical requirements. And the entire communication should also be secure.

All these things are made possible by the Internet of Things (IoT). IoT is a global industry movement that brings people, processes, data and things together to make networked connections more relevant and valuable than ever before. It essentially encompasses every step of the process from data collection and usage to value creation from such data. Today, there are still many things in the world that are not interconnected. In the near future, the growth and convergence of information, people and things on the internet will create unprecedented opportunities for countries, industries and individuals. Devices are getting smaller and smaller and memory and computing power bigger, so it is possible to connect more and more things with the cloud, the edge or with each other. For providers of network devices and applications, the IoT potentially represents a major market opportunity.

- Rapid growth of data and analysis capabilities through cloud computing
- Rapid growth in smart mobile devices
- Increasing networking between industrial, operational and intelligent mobile devices
- Convergence of industrial and enterprise networks that enable applications such as video surveillance, smart meters, asset tracking, fleet management, digital health monitoring, and a host of other next-generation networked services.

Besides giving a quick introduction into the market, this report is intended to give you an overview of transactions and company valuations in your industry. We thank you for your interest and would be pleased to answer any questions you may have in connection with the sale and purchase of companies, valuation and corporate finance.

Your Technology Team from Oaklins Germany



Jan P. Hatje
Vorstand

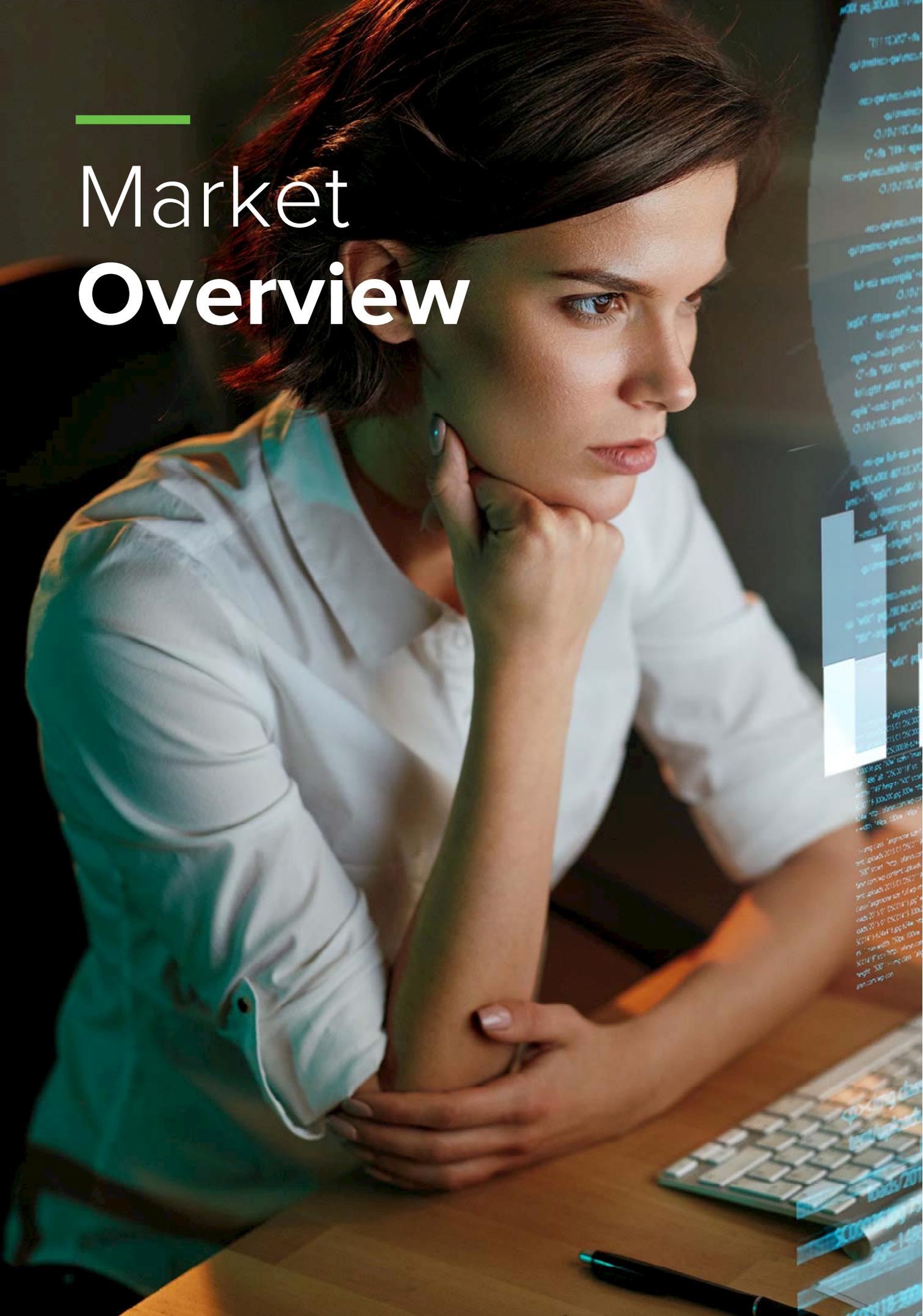


Carsten Wagener
Senior Associate

Agenda

1	Market Overview	4
1.1	Markets for IoT Applications	5
1.2	Overall Technology M&A Market	7
1.3	IoT Investment Landscape	9
1.4	Selected Transactions 2018	10
1.5	Layers of IoT	11
2	Perceptual "Things" Layer	12
2.1	Major Players: Vodafone, Enertrec, Cisco, Samsung and Intel	13
2.2	Deal Summary and Selected Transactions	14
3	Network „Connectivity/Edge“ Layer	15
3.1	Major Players: Cisco, IBM, Verizon and Nokia	16
3.2	Deal Summary and Selected Transactions	17
4	Infrastructure Layer	18
4.1	Major Players: Oracle, Alibaba and Google	19
4.2	Deal Summary and Selected Transactions	20
5	„Data Ingestions“ and „Data Analytics“ Layer	21
5.1	Major Players: Luminoso, Feedzai and Splunk	22
5.2	Deal Summary and Selected Transactions	23
6	„Applications“ Layer	24
6.1	Major Players: WillowTree, Intellectsoft, Google, IBM and Engie	25
6.2	Deal Summary and Selected Transactions	26
7	“People & Process” Layer	27
7.1	Summary and Outline of Major Players	28
8	Security & Privacy	29
8.1	Major Players: LightCyber, NSS Labs, ZeroFOX, Rubicon and McAfee	30
8.2	Deal Summary and selected Transactions	31
9	About Oaklins	32
9.1	Relevant M&A Experience	34
10	Contact Details	39

Market Overview

A woman with dark hair, wearing a white button-down shirt, is sitting at a desk in a dimly lit office. She is looking intently at a computer monitor. Her right hand is resting on her chin, and her left hand is resting on her right arm. The background is dark, and the lighting is focused on her face and the desk. On the right side of the image, there are several semi-transparent, glowing blue and white overlays that appear to be data or code, including a bar chart and various text fragments. The overall mood is professional and focused.

MARKETS FOR IOT APPLICATIONS ARE GROWING FAST

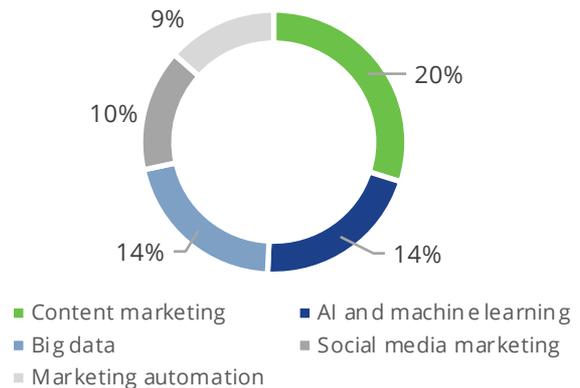
Digitalization and thus the usage of IoT touches nearly every aspect of our daily lives. But the level of adoption varies greatly between different areas. According to the latest study of Dresner advisory services, Sales and Marketing are the two main areas of early IoT adoption. Looking to gain real-time customer feedback on the performance of products and services, Sales and Marketing are the leading areas of application of IoT solutions today looking to increase the degree of automation in the process. However, marketing automation is still in the early stages when it comes to achieving full market potential. Accordingly, the market is expected to show a CAGR of roughly 12%. Search advertisements are the most popular type of digital advertisement at the moment, with marketers boosting expenditure in 2018 by 12% to reach € 103Bn spent.

Marketing automation market (in billion EUR)



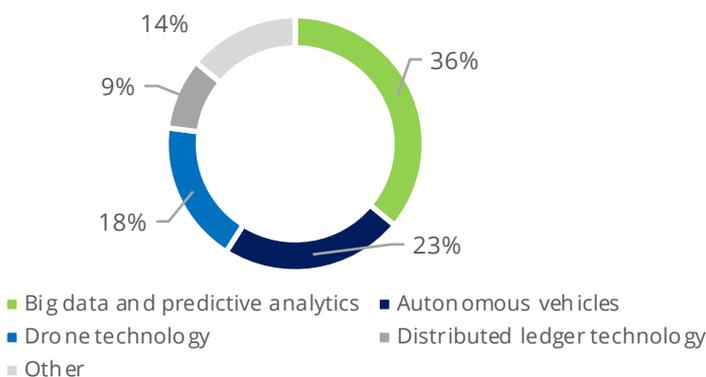
Sources: Zion Market Research, OnAudience, TechNavio, JEGI

Most effective digital marketing techniques 2018



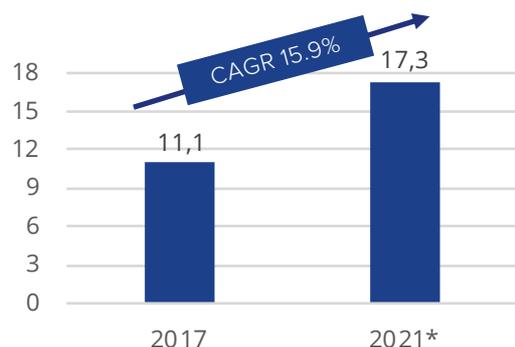
Besides Sales and Marketing, Operations and Logistics are finding value in IoT applications. Manufacturers see IoT as the most critical to achieving their product quality, production scheduling and supply chain goals. As a result, in addition to the production automation, big data paired with predictive analytics and machine learning applications started to gain traction. According to a study conducted by Norton Rose Fulbright, 36% of all technology investments the logistics sector in the next five years will go into big data and predictive analytics tools. Due to proven cost savings, both big data analytics and machine learning applications have experienced increased demand.

Predicted technology investments in the logistics sector until



Sources: Gartner, Norton Rose Fulbright, Statista

Global supply chain management software market (in billion EUR)

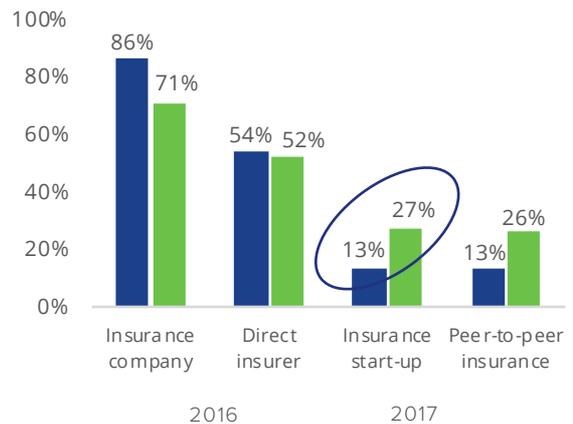


But also Insurance industry leaders most recently started to view IoT as critical to operations as their business models are now concentrating on automating inventory and safety management. Munich Re's acquisition of Relayr showcased that trend. Not only portals for insurance comparison, but also online insurance providers with AI applications experienced increased traction. Direct online health insurance premiums in Germany are expected to grow from 5.6 to 6.8 billion Euro. The online market for health insurances in USA outperforms the German market. Despite the hesitation toward online insurance in Germany, a market forecast reveals significant growth potential for online insurances in Germany.

Direct online health insurance premiums in Germany and USA (in billion Euro)



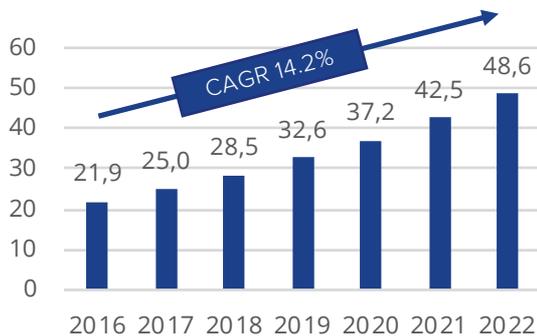
Market share of online insurance providers



Sources: Statista, ResearchAndMarkets.com, Allianz SE

Lastly, Smart Home is another upcoming market and part of the early adopters. With technological advances in voice control and artificial intelligence, smart home businesses are increasingly able to offer a whole suite of products and services to the consumer, with the intelligent assistant now being a viable control center for the connected home. Smart door devices also generate valuable information for the Energy Management segment as they can automatically adjust heating accordingly. New products of Amazon, Google, ADT and Samsung are driving adoption of smart home applications. In Europe, Centrica along with Deutsche Telekom are the two leading providers. Within the smart home market, the safety and security segment is expected to remain the largest segment. Strong growth is particularly anticipated within the segment of cloud security.

Global smart home market size (in billion EUR)



Projected global smart home security market value (in billion EUR)



Sources: Oaklins research, CBInsights, Statista

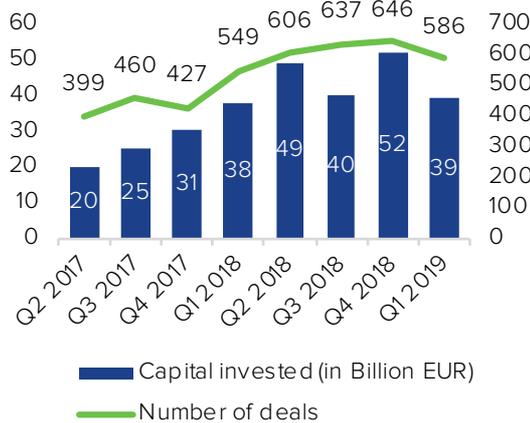
Sources: Oaklins research, CBInsights, Statista

OVERALL TECHNOLOGY M&A MARKET

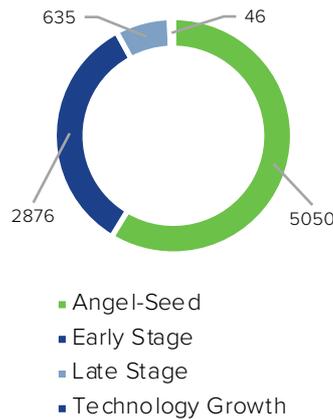
Along with the growth of the overall IT industry, M&A activity has increased once again in H1 2018. By the end of H1 2018, global TMT transaction values had reached \$371.1 billion and 1,693 deals, representing a 19% share of global M&A, according to the latest worldwide market study by Mergermarket. The total deal value in H1 2018 in the overall TMT sector grew by 107% year-on-year, when compared to figures from H1 2017 (\$179.4 billion), though the deal count fell by 53 transactions (from 1,746). The U.S. led in market share with \$143.9 billion and 646 deals, representing a 39% share of global TMT value, with Europe following with \$129.8 billion and 569 deals, representing a 35% share of total value. Asia-Pacific recorded \$86.3 billion and 376 deals, representing a 23.3% share of total value.

The technology sector accounted for the largest share of TMT’s total deal value in 2018 thus far achieving a 46.2% with \$171.5 billion, while the Technology deal count of 1,329 transactions was responsible for 78.5% percent of TMT’s total volume for the period. Venture capital transactions account for a large number of those transactions. VC investment jumped 71% year-on-year to \$52 billion (Q4 2018), according to a new report from PitchBook and the National Venture Capital Association. In Q1 2019, this number fell to \$39 billion and the number of deals also decreased slightly. Despite reaching post-Dot Com highs in absolute terms, angel and seed investments make up for a smaller percent of total dollar volume than in any quarter since Q3 2013.

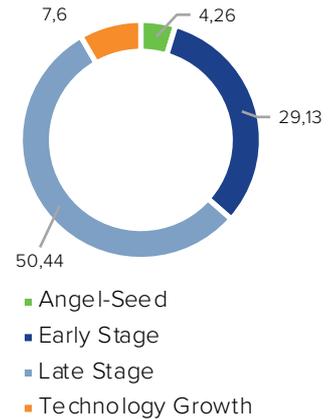
Late-Stage Investment Q1 2019



Global VC Deal Count Q4 2018



Global VC Deal Volume Q4 2018 (in billion EUR)



Sources: Oaklins research, Mergermarket, PitchBook, Crunchbase,

Sources: Oaklins research, Mergermarket, PitchBook, Crunchbase,

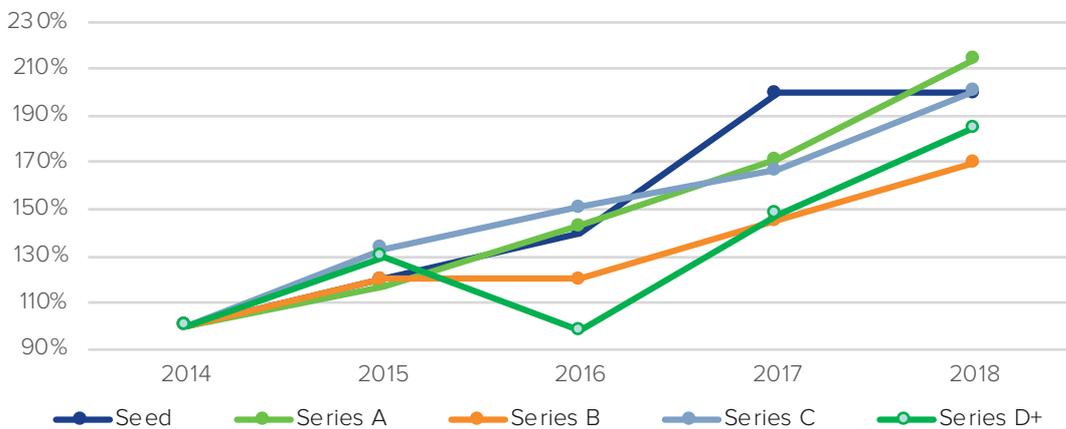
Software startups collected \$23.7 billion in venture investments in H1 2018, which accounts for roughly 41% of the total venture investment. Measuring the deal count, they accounted for roughly 42% of all venture deals. However, a large share of the money flowing into venture-backed startups isn't coming from traditional venture capital firms anymore. In fact, about 63% of the total amount invested came from private equity and other nontraditional sources. Private equity investors feel increasingly comfortable investing in young technology companies. This is for two reasons: Business models, especially in the world of IoT, have proven to add value to businesses from a variety of industry and therefore have proven their market value. In addition, an increasing number of young technology firms turned profitable in the past two years.

However, due to the significant increase in fund volumes of most major VC firms and their enhanced ability to participate in and lead late stage investment rounds, private equity deals with previously venture-backed companies declined from 21 percent to 4 percent. In order to compete with SoftBank’s \$100 billion fund, many VC firms are raising big new funds. Sequoia Capital’s third Global Growth Fund is expected to top out at \$8 billion. Scale Venture Partners, Index Ventures, and Lightspeed Venture Partners announced \$4 billion in new capital across six new funds.

Valuations increased across the board

Valuations increased, in tech M&A as well as capital raises, between 69% and 98% from 2014 to H1 2018. Series A valuations see the relatively greatest increase between 2017 and 2018 with 43% as well as the greatest total increase with over 100% since 2014.

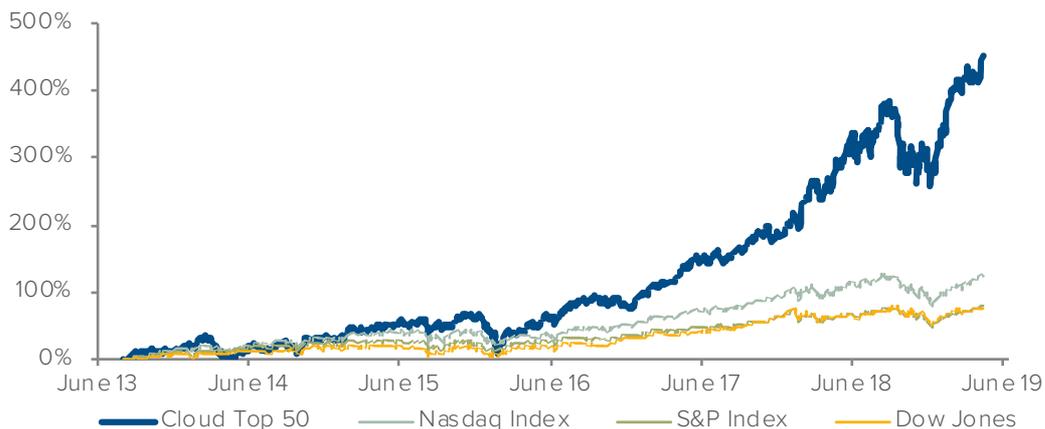
Development of Valuations in M&A and Capital Raises since 2014



Sources: Oaklins research, Mergermarket, PitchBook, Crunchbase

The Cloud Index by Bessemer Venture Partners, an industry index designed to track the performance of emerging public companies primarily involved in providing cloud software to their customers, shows that the increase in valuations is also reflected in the public markets.

Development of Valuations in M&A and Capital Raises since 2014

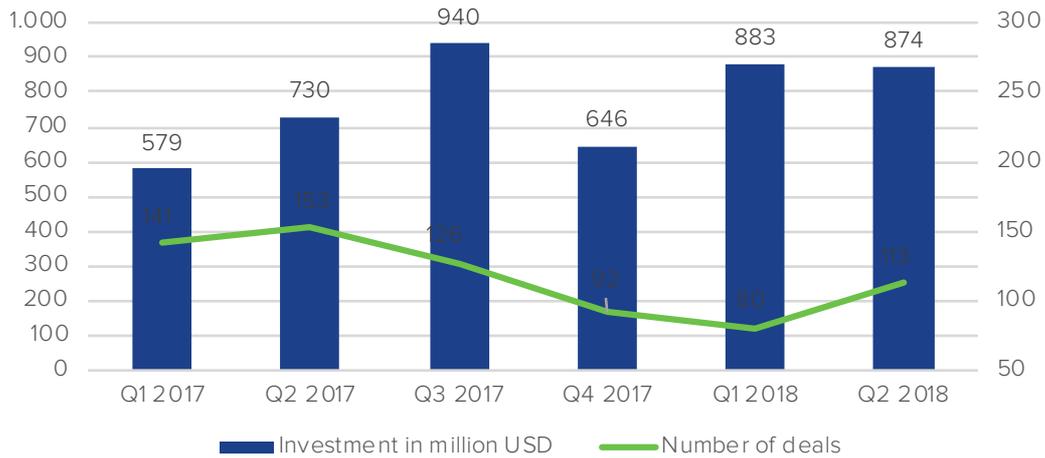


Sources: Bessemer Ventures Cloud Comps

IOT INVESTMENT LANDSCAPE

Early adopters invest in dashboards and reporting tools while priorities are on applying advanced and predictive analytics as access to advanced analytics for predictive and temporal analysis is the most important usability benefit. The last 12 months saw \$3.3 billion in total recorded IoT investments. With 27 acquisitions, Q2 2018 set a new record. There are currently approximately 100 recorded IoT funding rounds per quarter. Q2/2018 total recorded IoT investments volume was \$874 million. For the majority of the transactions in this sector the sale price is not disclosed. Therefore the illustration below only accounts for the deals with disclosed value.

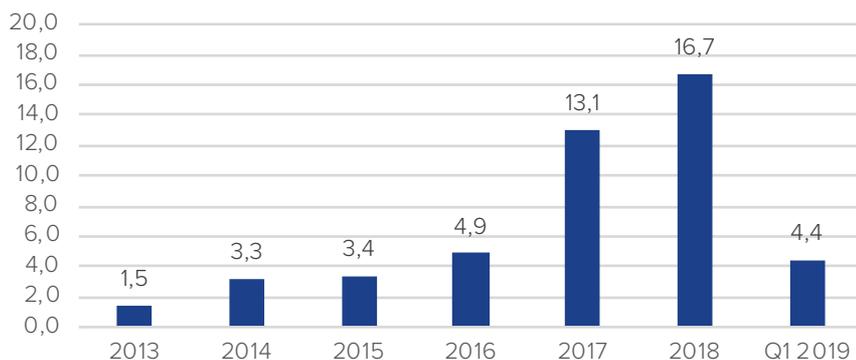
Overall Investments in Early-Stage IoT Companies since 2017



Sources: Postscapes IoT report

Q2 2018 showed a slight decrease in IoT investments from the previous quarter but it is still a 20% increase year-on-year. The data suggests that investments in IoT are passed the strong growth stage that they have experienced in the previous years. However, recent successful exits show that the value of IoT applications has been proven, which also explains the ongoing stream of investments in young IoT companies. We expect an increasing number of acquisitions in the coming quarters, considering that the IoT hype started in 2014 and that investors usually have an investment cycle of minimum of 5 years.

AI startup company funding worldwide (in billion EUR)



Sources: Statista, Oaklins research

The combination of the data that is generated by IoT devices, artificial intelligence, namely machine learning, has found a use case that is able to generate significant value for business today and in the future.

SELECTED TRANSACTIONS 2018 / 2019

	TARGET	EV	EV/REV*	ACQUIRER	
Feb 13, 2019	 AURIS	3,400	-		The company is committed to transforming medical intervention by integrating robotics, micro-instrumentation, endoscope design, sensing, and data science into one platform.
Feb 07, 2019	 WEBROOT	618.5	2.9x		Webroot, a Carbonite company, harnesses the cloud and machine learning to reliably predict and protect against cyberattacks in real time.
Mar 26, 2019	 AgileCraft	265	-		AgileCraft brings together the teamwork happening across an organization into an all-encompassing view that connects strategy, work, and outcomes.
Mar 25, 2019		-	-		Dynamic Yield is an AI-powered Personalization Anywhere™ platform that delivers individualized experiences at every customer touchpoint.
Jan 01, 2019	 CloudEndure	250	-		CloudEndure is a cloud computing company that develops business continuity software solutions for disaster recovery, continuous backup, and live migration.
Nov 12, 2018	 qualtrics	8,000	14.0x		Qualtrics' XM Platform collects feedback and data across customers, employees, product and brand.
Nov 11, 2018		1,950	10.4x		Apttio is the leading provider of cloud-based Technology Business Management (TBM) software that helps manage the business of IT.
Oct 1, 2018	 mx mendix	600	-		Mendix is a low-code software platform. It provides tools to build, test, deploy and iterate applications.
Sep 20, 2018	 Marketo	4,750	14.8x		Marketo develops marketing automation software that provides marketing, social marketing, CRM, and other related services.
Sep 4, 2018	 relayr.	300	-		Relayr enables device manufacturers, app developers, and software companies to leverage the power of the internet of things.
Aug 6, 2018	 AVNERA	405	-		Avnera is a semiconductor company developing integrated analog system-on-chip technology for audio and voice applications.
Jul 31, 2018	 accruent	2,000	7.3x		Accruent helps organizations transform the management of their physical resources with IoT enabled remote monitoring.
Jul 29, 2018	 TREASURE DATA	600	-		Treasure Data is an end-to-end, fully-managed cloud service for big data. It includes data connectors, machine learning and AI.
Jun 21, 2018	 simility	120	-		Simility helps companies prevent fraud and abuse in real time with machine learning, big data analytics and data visualization.
Jun 11, 2018	 VictorOps	120	-		VictorOps incident management software gives DevOps observability, collaboration, & real-time alerting, deploy, & operate software.
Jun 11, 2018	 Adaptive Insights	1,550	13.6x		Adaptive Insights is powering a new generation of business planning with the Business Planning Cloud.
May 28, 2018		9	3.8x		Hyperfish uses AI and Bot technology to automate the collection of profile information. The service works on-premises and online.
May 23, 2018	 2ia	58	3.3x		A2iA is a developer of software tools that help optimize their data capture, document processing and workflow automation.
	Median		8.9x		
	Mean		8.8x		

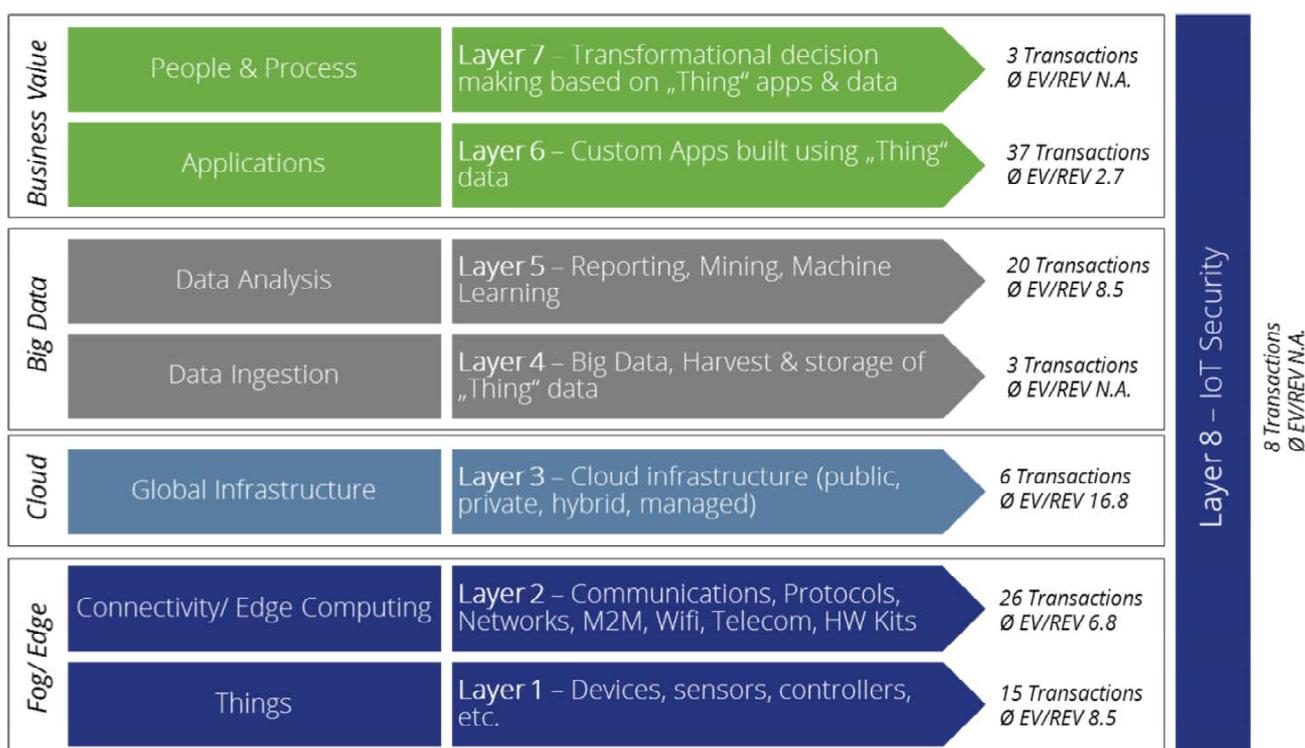
Sources: Mergermarket, Crunchbase, Pitchbook, Press Releases

*Last twelve months (LTM) Revenue

LAYERS OF IOT

The IoT Reference model used by Cisco to describe the different levels of IoT is a good starting point for distinguishing the different business models in the IoT, but in particular the related valuations assigned to them. It is important to note that in the IoT, data flows in both directions. In a control pattern, controlled information flows from the top of the model to the bottom while in a monitoring pattern, the flow of information flows in the opposite direction. When evaluating an IoT business model however, it is crucial to know where it fits in and what problem it solves for the customers, because this is how value is generated in the end.

We have used the Cisco model as a basis to look at the past deals from January 2014 onwards. The results are briefly shown in the illustration below:



In the recent years, especially in 2018, deals related to layer 5 have increased significantly. This is mostly due to improved business models based on machine learning applications or artificial intelligence in general. From 2014 to 2016, transactions related to layer 1 and 2 were more common. Overall, valuation in the IoT sector are on the high end, even when compared to other tech sectors such as payment solutions. This can be explained by the fact that IoT business models have proven to solve problems in existing business models which enables businesses to save significant amounts of money. This is true for all kinds of businesses, from a cow farm where the well-being of the animals and therefore the milk output is improved, to an increase in run time of machines in production. Other IoT applications, especially machine learning applications, make things possible that have been out of reach before. A good example here are self-driving cars, where deep learning allows to read street signs and identify obstacles.

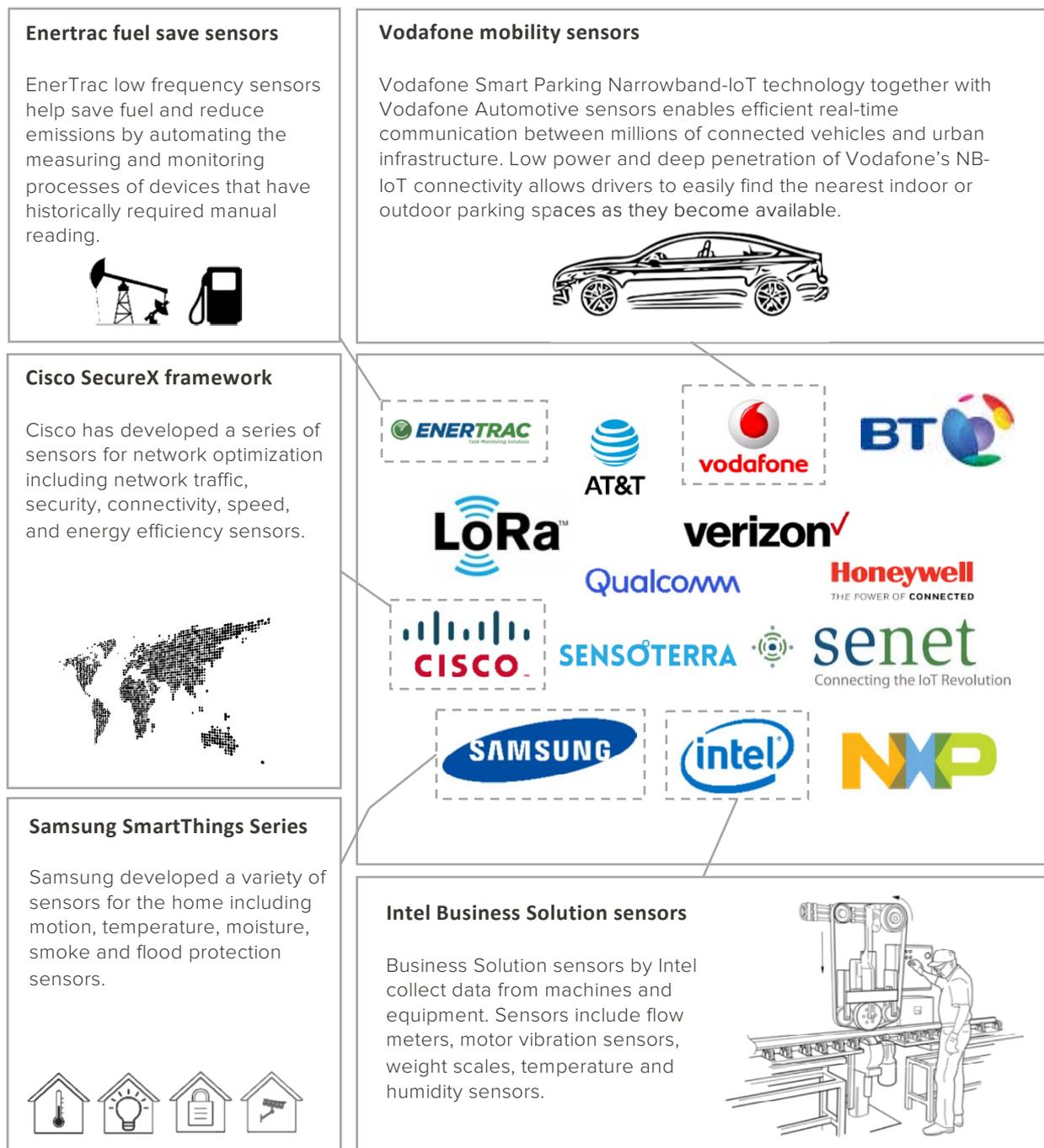
Perpetual „Things“ Layer



LAYER 1: PERCEPTUAL „THINGS“

The main task of the perceptual layer is to perceive the physical properties of the things around us that are part of the IoT. This perception process is based on several sensor technologies (e.g. RFID, WSN, GPS, NFC). In addition, this layer is responsible for converting the information into digital signals that are more suitable for network transmission. In some cases microchips are attached to objects in order to extend them with sensing and even processing functions. In fact, nanotechnologies and embedded intelligence will play a key role in this layer. The first will make the chips small enough to be implanted in the objects of our daily lives, the second will expand them with processing capabilities needed for future applications.

The illustration below shows the biggest players in this layer:



Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Of the 15 transactions we selected for this category, only 1 took place in 2018, while the majority closed in 2016 and 2017. Deal values ranged from 7 million to close to 2 billion Euro. The largest EV/REV multiple used in the analysis is 23.9. A large number of the deals took place in the US and involved major industry players such as Cisco, Amazon and Honeywell.

Number of transactions: 15	Average EV/REV: 8.5x	Max EV/REV: 23.9x
--------------------------------------	--------------------------------	-----------------------------

Please see below two recent selected deals in this segment, which we found to be exemplary:

Accruent acquired by Fortive

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jul 31, 2018			2,000	7.3x		

Rationale: Fortive is a diversified industrial growth company with several strong product lines in the industrial automation market. Accruent is a global software company that helps organizations transform how they manage their physical resources with IoT Enabled Remote Monitoring. The Accruent deal will help Fortive complement strengths in its Fluke Digital Systems unit and its recent acquisition of construction software company Gordian to create a technology portfolio consisting of connected devices, software enabled workflow and data analytics.

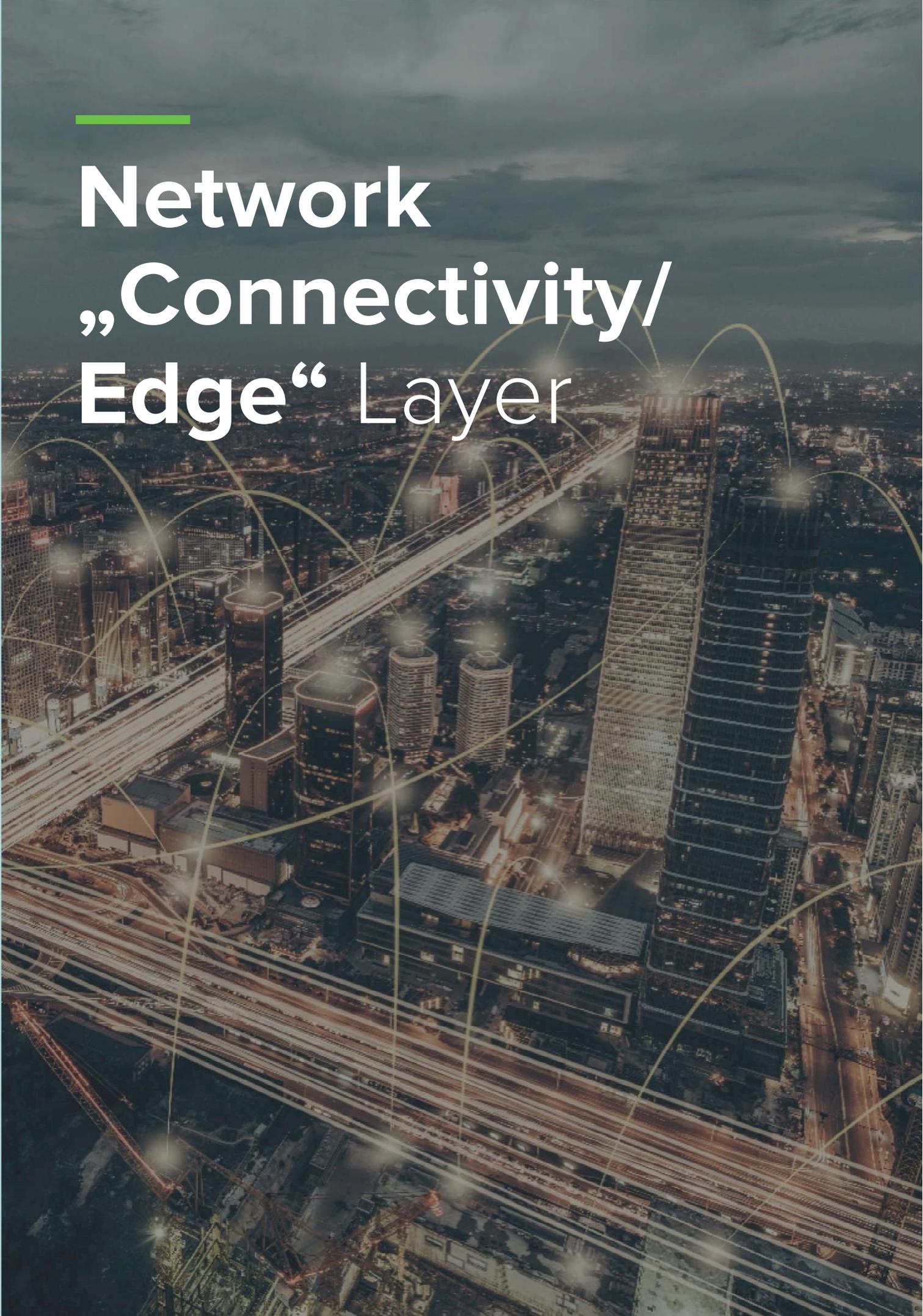
Ring acquired by Amazon

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Feb 28, 2018			1,000	-		

Rationale: Amazon's home automation division has been growing strongly over the past couple of years with their flagship product Amazon Echo. Ring is an outdoor home security that provides homeowners a line of preventative security doorbells and cameras. The Ring acquisition offers the company a popular consumer electronics brand that it might not have replicated internally. More importantly, Ring's security devices could work well with Amazon Key, a smart lock and camera system that lets delivery personnel put packages inside a home to avoid theft or, in the case of fresh food, spoiling.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases

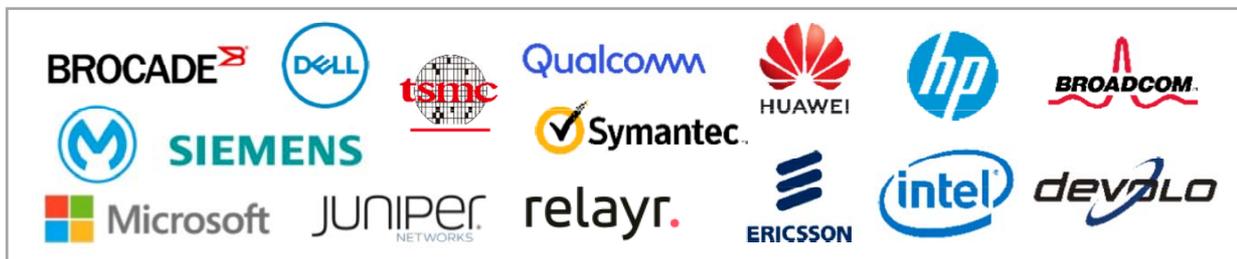
Network „Connectivity/ Edge“ Layer

An aerial night view of a city with a complex network of glowing yellow and white lines overlaid on the buildings and infrastructure, representing a network or connectivity layer. The lines form a dense web connecting various points across the cityscape. The background shows a city with illuminated buildings and roads under a dark sky.

LAYER 2: NETWORK „CONNECTIVITY/EDGE“

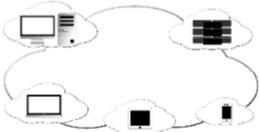
The network layer is responsible for processing the data received from the perceptual layer. It is also responsible for data transmission to the application layer through various network technologies such as wireless or wired networks. The main transmission media are FTTx, 3G/4G, Wifi, Bluetooth, Zigbee, UMB and infrared technology. Huge amounts of data are transmitted over the network. Therefore, it is critical to provide a solid middleware to store and process this enormous amount of data. IoT involves Machine-to-Machine (M2M) communications among many different types of devices having various protocols. Managing this kind of a variation is difficult since a majority of application areas do not support mobility. As of now WiFi and Bluetooth are used for mobility applications to a certain extent. Mobile Edge Computing (MEC) in particular is anticipated to become a major complement to enterprise computing infrastructure. As of now, edge computing implementation, teleoperation and tele-robotics are largely limited to fixed communication connections. MEC will enable teleoperation anywhere there is advanced LTE or 5G coverage, enabling many new consumer and industrial automation scenarios involving robotics.

The illustration below shows the biggest players in this layer:




Cooperation of Cisco and IBM for edge computing

Last year, IBM and Cisco announced a collaboration to provide instant IoT insights at the edge of the network. They offer IBM’s business analytics technologies and Cisco’s edge and fog capabilities to more deeply understand and act on critical data on the network edge.




Verizon Edge

Verizon’s ambitions to digitize and connect cities across the U.S. is increasingly being fueled by their investments in 5G, the fifth generation of wireless technology. Verizon is currently testing a smart city service that applies edge computing technology to video feeds in order to allow city officials to remotely observe residents in real time.




Nokia AirFrame Open Edge Server

Nokia launched industry-first Edge Cloud data center solution for the 5G era, supporting industry automation and consumer applications. The AirFrame is an ultra compact server that processes data closer to users, providing ultra-low latency support for time-critical applications such as industry automation, augmented reality and Cloud RAN.



Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Of the 27 transactions we selected for this category, only 1 took place in 2018, while the years 2015 through 2017 saw roughly the same deal activity with around 7 closed deals per year. Deal values ranged from 5 million to close to 27 billion Euro (Softbank’s acquisition of Arm in 2016). The largest EV/REV multiple used in the analysis is 19.6x. Besides large US players, European buyers were also active in this segment.

Number of transactions: 25	Average EV/REV: 6.8x	Max EV/REV: 19.6x
--------------------------------------	--------------------------------	-----------------------------

Please see below two recent selected deals in this segment, which we found to be exemplary:

Acquisition of Relayr by Munich Re

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Sep 4, 2018			300	-		

Rationale: Munich Re Group or Munich Reinsurance Company is a reinsurance company based in Munich, Germany. It is one of the world’s leading reinsurers. Relayr enables device manufacturers, app developers, and software companies to leverage the power of the internet of things. The joint business model will develop solutions for clients, offering not only technology but also risk management, data analysis and financial instruments. Munich Re is taking a further key step to create new business models in the industrial IoT.

Avnera acquired by Skyworks

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Feb 28, 2018			1,000	-		

Rationale: Skyworks Solutions, Inc. is an innovator of high performance analog semiconductors connecting people, places and things. Avnera is a fabless semiconductor company developing integrated analog system-on-chip technology for consumer audio and voice applications. The Avnera acquisition augments Skyworks’ leadership in wireless connectivity by adding ultra-low power analog circuits to enable smart interfaces via acoustic signal processing, sensors and integrated software. Upon signing, Skyworks will expand its addressable market by over \$5 billion. Target applications include AI speakers/microphones, virtual assistants, intelligent gaming controllers and vehicle in-dash systems as well as wired/wireless headsets.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases



Infrastructure Layer

LAYER 3: „INFRASTRUCTURE“

The global infrastructure layer deals with the delivery of storage and computing resources towards supporting custom business solutions. This can either be established by an up front investment or by using a Infrastructure as a Service „IaaS“ provider. Enterprises opt for an IaaS cloud computing model in order to benefit from lower prices, the ability to aggregate resources, accelerated deployment, as well as increased and customized security. These services provide the means for accessing sensors and actuator in the cloud. The associated business model is to act either as data or sensor provider.

Another option is a Platform as a Service „PaaS“ provider, which is the most widespread model for IoT services. Most public IoT clouds come with a range of tools and related environments for application development and deployment in a cloud environment. A main characteristic of PaaS IoT services is that they provide access to data, not to hardware. PaaS provides development environments for creating cloud-ready business applications. It provides a deeper set of capabilities comparing to IaaS, including development, middleware, and deployment capabilities. PaaS services create and encourage deep ecosystem of partners who commit to this environment. Typical examples of PaaS services are Google’s App Engine and Microsoft’s Azure cloud environment, which both provide a workflow engine, development tools, a testing environment, database integration, as well as third-party tools and services.

The illustration below shows the biggest players in this layer:

<p>ORACLE®</p> <p>Oracle Cloud IaaS</p> <p>Oracle Cloud Infrastructure combines the elasticity and utility of public cloud with the granular control, security, and predictability of on-premises infrastructure to deliver high-performance, high availability and cost-effective infrastructure services.</p>	<p>SIEMENS</p> <p>Siemens Mindsphere</p> <p>MindSphere is an open cloud platform or IoT operating system developed by Siemens for applications in the context of IoT. MindSphere stores operational data and makes it accessible through digital applications to allow industrial customers to make decisions based on valuable factual information.</p>	<p>Google</p> <p>Google Cloud Platform</p> <p>Google Cloud Platform is a suite of cloud computing services that runs on the same infrastructure that Google uses for Google Search and YouTube. It includes the public cloud infrastructure, as well as G Suite, enterprise versions of Android and Chrome OS, and APIs for machine learning and enterprise mapping services.</p>

Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Out of the 6 transactions we selected for this category, 2 took place this year, while 3 of the remaining 4 took place before 2017. The largest EV/REV multiple used in the analysis is 20.0. Only two of the transactions used in the analysis showed sufficient profound data to derive a multiple. In addition, both transactions were closed at unusually high multiples. Therefore, the average multiple in this layer should be regarded with caution. Besides large US players, European buyers were also active in this segment.

Number of transactions:
6

Average EV/REV:
16.8x

Max EV/REV:
20.0x

Please see below two recent selected deals in this segment, which we found to be exemplary:

Acquisition of Treasure Data by Arm

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jul 29, 2018			600	-		

Rationale: Arm Holdings is a British multinational semiconductor and software design company, owned by SoftBank Group and its Vision Fund. Treasure Data provides the ability to aggregate and translate massive volumes of scattered and stored data. The company's technology deals with data from any source - CRM, ecommerce systems, edge, IoT devices, and any third-party data. Treasure Data is the final piece of Arm's IoT enablement offering. Its technology, along with that of another recent acquisition for connectivity management (Stream), combined with Arm Mbed Cloud creates the Arm Pelion IoT Platform.

Workday acquired Adaptive Insights

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jun 11, 2018			1,550	13.6		

Rationale: Workday, Inc. is a leader in enterprise cloud applications for finance and human resources. Adaptive Insights is powering a new generation of business planning with the Business Planning Cloud. The acquisition will give Workday another tool in its attempt to become the go-to place for all for back-office services for its business customers. The company plans to integrate Adaptive Insights' tools into its existing platform in order to help customers accelerate their finance transformation in the cloud.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases

„Data Ingestions“ and „Data Analytics“ Layer



LAYER 4 + 5: „DATA INGESTIONS“ AND „DATA ANALYTICS“

In the data ingestions and analytics layer, the collection, organization and analysis of large sets of data (Big Data) is performed to discover patterns and other useful information. Big Data analytics can help organizations to better understand the information contained within the data and will also help identify the data that is most important to the business and future business decisions. Big Data analytics is typically performed using specialized software tools and applications using machine learning algorithms for predictive analytics, data mining, text mining, forecasting and data optimization. Here, Deep Learning (DL) models in general bring two important improvements over the traditional machine learning approaches. Instead of training a computer with data sets like you would with machine learning, you give the computer instructions and an expected goal. From those instructions, the computer will find the optimal way to reach that goal. DL models allow for some features that might not be apparent to a human view to be extracted more easily. In addition, DL models improve the accuracy of the results.

Beyond the big data analytics, IoT data requires more sophisticated analytics, namely fast and streaming data analytics, to support applications with high-speed data streams and requiring real-time or near real-time actions. Applications such as autonomous driving, fire prediction, driver posture and thus consciousness and/or health condition recognition demands for fast processing of incoming data and quick actions to achieve their target. For those IoT applications, analytics have to be performed on smaller scale platforms at the edge or even on the IoT devices themselves. For instance, autonomous cars need to make fast decisions on driving actions such as lane or speed change. In this case, transferring data to a cloud server for analysis and returning back the response is subject to latency that could cause traffic violations or accidents. A more critical scenario would be detecting pedestrians by such vehicles.

The illustration below shows the biggest players in this layer:

 <p>LUMINOSO</p> <p>Luminoso text recognition</p> <p>Luminoso Technologies is a leading natural language understanding company that enables clients to rapidly discover value in their unstructured text data.</p> 	 <p>Digital Reasoning</p> <p>Communication analytics</p> <p>Digital Reasoning’s AI platform understands human intentions and behaviors. It automates key tasks and uncovers transformative insights from human communications.</p> 	 <p>splunk</p> <p>Splunk Real-time machine data analytics</p> <p>Splunk is the market leader in analyzing machine data to deliver operational intelligence for security, IT and the business.</p> 

Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Of the 23 transactions we selected for this category, 8 took place in 2018 and 9 in 2017. Out of the remaining 6 transactions, most took place in the second half of 2016. This shows how active this layer has become in the recent years. This is mostly due to the rise of machine learning applications as well as the artificial intelligence in general. The deal values range from 5 million to 519 million Euro. The largest EV/REV multiple used in the analysis is 15.8. Besides large US and European players, Asian investors such as Softbank and Alibaba are active in this sector.

Number of transactions:
23

Average EV/REV:
8.5x

Max EV/REV:
15.8x

Please see below two recent selected deals in this segment, which we found to be exemplary:

Acquisition of Hyperfish by LiveTiles

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
May 28, 2018			9	3.8		

Rationale: LiveTiles is the market leader in intelligent workplace software that creates user experiences that are further enhanced through artificial intelligence and advanced analytics capability. Hyperfish uses AI and Bot technology to automate the collection of profile information. The secure service supports on-premises, hybrid, and online environments. The acquisition of Hyperfish by LiveTiles represents the merger of two of the fastest growing and most exciting companies in the Microsoft ecosystem. Their combined technologies will enable LiveTiles to deliver organizations the most compelling and advanced Intelligent Workplace platforms.

Salesforce acquired Datorama

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jul 17, 2018			800	-		

Rationale: The Salesforce Marketing Cloud provides digital marketing automation and analytics software and services while Datorama is an AI-powered marketing intelligence platform that transforms the way marketers optimize their marketing performance. The acquisition of Datorama will enhance the power of Marketing Cloud with expanded data integration and intelligence, enabling marketers to unlock insights across all of their marketing channels and data sources. With one unified view of data and insights, companies will be able to make smarter decisions across the entire customer journey and optimize engagement at scale.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases

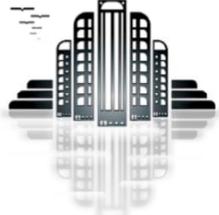
„Applications“ Layer



LAYER 6: „APPLICATIONS“

The applications layer uses the processed data of the infrastructure or data analysis layers. This layer is the front end of the entire IoT architecture, through which IoT potentials are exploited. For instance, data can be displayed on dash boards. The range of possible applications includes intelligent transport, logistics management, identity authentication, location-based services, healthcare, finance, security, etc.). The latest applications show real-time data from various sensors. This layer is also where the value for the business is generated. The output can be customized and tailored to the different needs of the target groups.

The illustration below shows the biggest players in this layer:

<p>Intellectsoft hospitality application</p> <p>Intellectsoft’s dashboard and CMS shows insights on hotel guests’ behavior, identifies returning visitors and measures success of marketing campaigns by polling and analytics.</p> 	<p>WillowTree consumer data application</p> <p>WillowTree is an industry leader in field solutions, media delivery, loyalty programs and payments, and connected devices and works with brands such as GE, Johnson & Johnson, Time Warner, AOL, American Express, and Harvard Business Publishing. Clients trust WillowTree to guide and execute their mobile initiatives.</p> 
<p>Google website analytics</p> <p>Google Analytics is a web analytics service offered by Google that tracks and reports website traffic, currently as a platform inside the Google Marketing Platform brand.</p> 	
<p>IBM Cognos Analytics</p> <p>IBM Cognos Analytics integrates reporting, modeling, analysis and dashboards to help businesses understand the organization's data and make business decisions.</p> 	<p>Engie energy management solution</p> <p>Engie Insight is an energy and sustainability management company. Using insights based on consumption, cost and carbon footprint data the company provides fully managed, technology-optimized solutions for saving resources, which in turn increase returns, lower risks, and enhance reputations.</p> 

Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Of the 37 transactions we selected for this category, 11 took place in 2018 and another 11 in 2017. Out of the remaining 15 transactions, 6 took place in 2016. Dashboard solutions have become popular among venture capital investors a few years earlier than machine learning and artificial intelligence applications. There is also a higher percentage of profitable businesses in this layer. However, most of the exits have occurred after 2016 in this segment as well. The deal values range from 6 million to 2.8 billion Euro. The average EV/REV multiple in this layer is significantly lower than in the other layers, while still remaining very attractive compared to other markets. The largest multiple used in the analysis is 7.7. Besides large US and European players, Asian investors such as Tencent are also active in this segment.

Number of transactions:
37

Average EV/REV:
2.7x

Max EV/REV:
7.7x

Please see below two recent selected deals in this segment, which we found to be exemplary:

Acquisition of Hyperfish by LiveTiles

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Oct 01,2018	 mendix		600	-	 SIEMENS	

Rationale: Siemens has been on a mission to leverage its foothold and data-rich infrastructure in the physical world, to become a leader in the digital world, investing over 10 billion USD in the last decade to acquire and build out software businesses, and to create the Industrial IoT platform, MindSphere. By combining Mendix and MindSphere, Siemens will be in a unique position to bridge the physical and digital worlds by extending the Mendix platform to provide tools to build, test, deploy and iterate applications.

Salesforce acquired Datorama

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jul 17, 2018	 people doc		300	-	 Ultimate SOFTWARE	

Rationale: Ultimate Software develops and sells UltiPro, a cloud-based human capital management solution for businesses. PeopleDoc is a Cloud-based HR Service Delivery platform enabling organizations to effectively manage HR operations and communications. The addition of the PeopleDoc HR Service Delivery platform will aid Ultimate Software to improve the employee experience by offering new, person-centric features, such as an online employee help center, HR case management, and employee file management.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases

“People & Process” Layer



LAYER 7: „PEOPLE & PROCESS“

The people and process layer includes people, businesses, collaboration and decision making based on the information derived from IoT computing. The IoT system and the information it generates are of little value unless it leads to actions that often require people and processes. Applications execute business logic to empower people. People use applications and associated data for their specific needs. Often several people use the same application for a number of different purposes. So the goal is not the application but the ability of people to do their job better. Applications provide business people with the right data at the right time so they can do the right thing.

But often the action requires more than one person. People need to be able to communicate and collaborate, sometimes over the traditional Internet, to make the IoT useful. Communication and collaboration often require several steps. And it is usually cross-application.

We count firms that are active in IT-consulting that also offer consulting in relation to IoT towards the group of companies that can be allocated to this layer.

The illustration below shows the biggest consulting firms active in IoT:



Source: Company Websites, Press Releases, Oaklins Research

Due to our focus on the different technologies of each layer themselves, we chose not to highlight any of the 3 transactions in IT-consulting we found in our research.

Security & Privacy



IOT SECURITY & PRIVACY

For the purpose of the IoT Reference Model, security measures must secure each device or system, provide security for all processes at each level secure, movement and communication between each level, whether north- or south-bound. According to Cybersecurity Ventures, cybercrime has risen to \$6 trillion annually, or 7 percent of the world’s economy. And the frequency and intensity of cyberattacks continues to grow. With the simultaneous growth of IoT and Big Data, security and privacy when it comes to gathered and stored data as well as processes will become increasingly important. As the entire value chain has to be protected, there are businesses that concentrate to secure the data on the lower layers such as devices and sensors, there are businesses that focus on the secure transmission of such data, and there are businesses that focus on the security once the data is processes and stored in the cloud and/or edge.

The illustration below shows the biggest players in this segment:

<p>Security testing</p> <p>The NSS Labs cloud platform measures the ongoing effectiveness of security controls, providing a real-time score card to help businesses substantiate their security investments.</p> 	<p>Behavioral Attack Detection</p> <p>LightCyber provides Behavioral Attack Detection solutions that provide accurate and efficient security visibility into attacks that have slipped through the cracks of traditional security controls. The company’s platform is the first security product to integrated user, network, and endpoint context to provide security visibility into a range of attack activity.</p> 
<p>Social media security</p> <p>ZeroFOX provides cloud-based software as a service for organizations to detect risks found on social media and digital channels, such as phishing, malware, scams, impersonator accounts, piracy, counterfeit and more</p> 	
<p>Rubicon IoT security</p> <p>Rubicon provides secure identity solutions for IoT devices. The platform uses symmetric cryptography, digital fingerprints, and a cloud based identity service to provide an end-to-end security solution.</p> 	<p>McAfee cloud security</p> <p>McAfee Skyhigh Security Cloud is a cloud access security broker (CASB). It automatically classifies sensitive information and enforces controls to remove the data to prevent data loss via cloud-based email and messaging.</p> 

Source: Company Websites, Press Releases, Oaklins Research

DEAL SUMMARY AND SELECTED TRANSACTIONS

Out of the 8 selected transactions, 6 transactions took place in 2018. The growth of IoT business models and the use of data have made it necessary to develop technology that protects the entire IoT value chain, from data collection to the use of such data. IoT security is one of the fastest growing markets. Therefore more and larger transaction can be expected in the future. The deal values range from 6 million to 2 billion Euro. No recorded transaction since 2014 has yielded a multiple that could be used for our analysis. European buyers are dominating the M&A market in this segment to date. US and Asian investors have only recently become active.

Number of transactions: 8	Average EV/REV: –	Max EV/REV: –
------------------------------	----------------------	------------------

Please see below two recent selected deals in this segment, which we found to be exemplary:

Acquisition of Treasure Data by Arm

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jun 21, 2018	 simity		120	-		

Rationale: PayPal has been at the forefront of developing innovative fraud prevention and risk management solutions for nearly 20 years. Simity helps companies prevent fraud and abuse in real time with machine learning, big data analytics and data visualization capabilities. The acquisition of Simity makes sense not just for its own systems, but for that of its customers, who make PayPal-powered transactions on the web, on mobile and at physical points of sales. Together with Simity, PayPal will be able to put more control in the hands of the merchants to fight fraud while helping make commerce experiences faster and more secure.

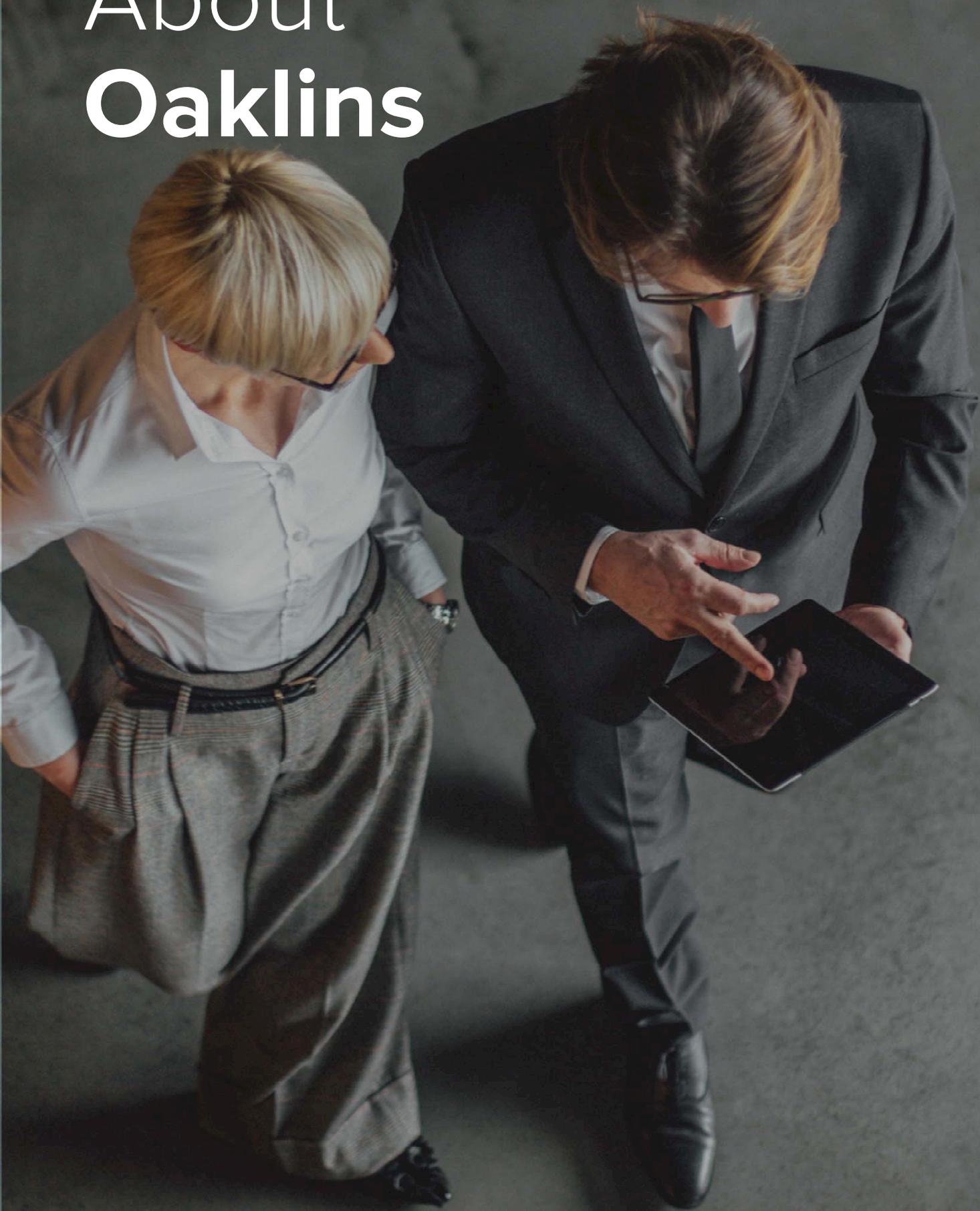
Salesforce acquired Datorama

DATE	TARGET	COUNTRY	EV (\$M)	EV/REV	ACQUIRER	COUNTRY
Jul 31, 2018	 solebit™		75	-	mimecast	

Rationale: Mimecast Limited provides e-mail management solutions. Solebit's cloud-based, real-time SaaS platform is focused on zero-day malware and unknown threats. Solebit blocks malicious active content with flow analysis, de-obfuscation and content evaluation. The transaction will enhance Mimecast's cyber resilience platform architecture. The acquisition will enable Solebit to bring another important set of microservices to the MimeOS platform that all of Mimecast's unified services are built upon.

Source: Mergermarket, Crunchbase, Pitchbook, Press Releases

About Oaklins



OUR “SECRET SAUCE”

In addition of using industry experts, our international approach is always executed through the local offices of the respective country to receive a feedback within a very short time due to the excellent network of the local colleagues. Clear structures within the Oaklins organization enable seamless international cooperation, remove unnecessary delays and result in a shorter overall process. Clearly defined time windows for a simultaneous international approach and a well structured schedule across all locations maximizes the "bidding war" and leads to a maximization of the competition.

IMPORTANT FACTS

Global reach

800 professionals in 60 offices in 40 countries

Experience

1,500+ transactions closed in the past 5 years, including 50% cross-border

Industry expertise

Specialization in 15 industry groups and sub-sectors

Global reach

No conflicts of interest

Focus on the mid-market

Transaction volumes from EUR 20m to 500m

30 years on the market

Oaklins (formerly known as M&A International) was founded in 1985

OUR TMT TRANSACTIONS IN THE PAST FIVE YEARS

Closed deals

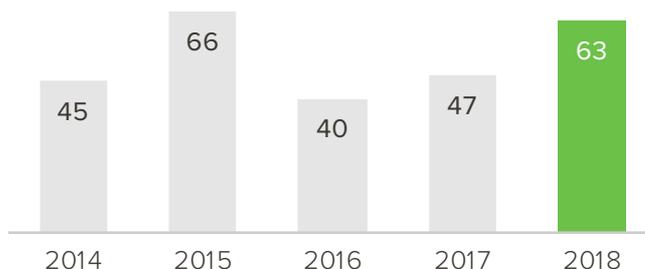
261

transactions closed 2014–2018

33%

cross-border transactions

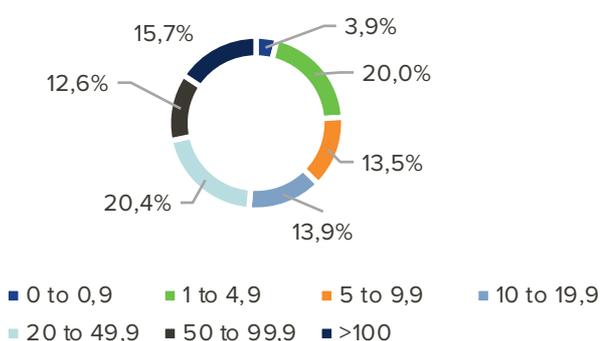
Number of transactions per year



WE ARE EXPERIENCED IN M&A AND CAPITAL RAISES

We are experienced Mid-Market M&A advisors, but we are also experienced with capital raises of all sorts, having closed a significant number of deals in both categories.

Transactions by volume



Besides having closed a significant number of M&A deals in 2018, we have closed 230 capital raises since 2017, ranging from US\$1m to over US\$100m. This includes capital increases from Series A to Series D, debt and mezzanine financing and public offerings.

RELEVANT M&A EXPERIENCE

AI/ Machine Learning (USA 2018)

Oaklins advised Panjiva, Inc., on the sale to S&P Global (NYSE: SPGI).

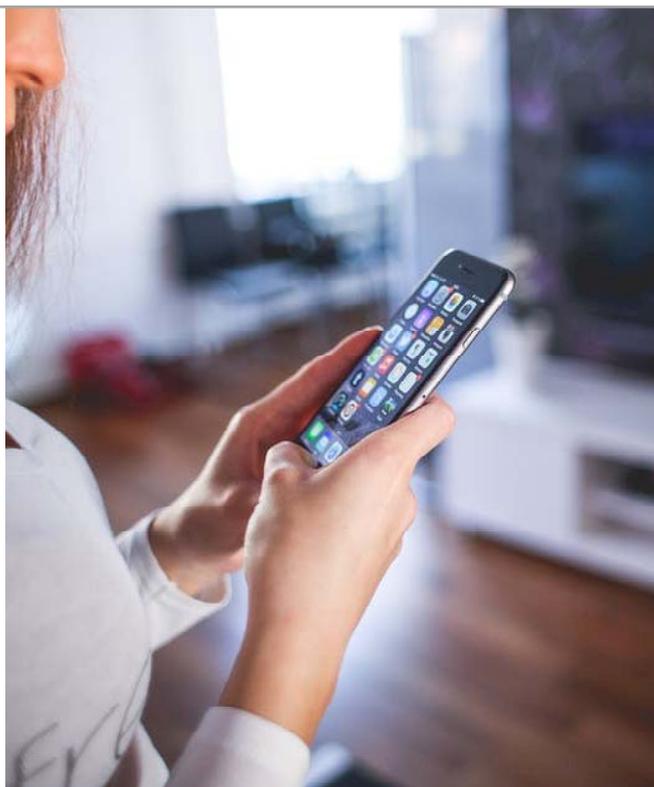
Panjiva, Inc. is a machine learning and data analytics company providing intelligence on global supply chains. Panjiva leverages machine intelligence to combine one billion transaction records into its proprietary Supply Chain Graph.



Home Automation (Italy 2018)

Oaklins advised V2 SpA on the sale to Nice SpA, a leading Italian industrial group active in the home and building automation sector.

V2 is a leading Italian company producing automation devices and motors for gates, garage doors, roller shutters for residential and industrial applications. Its products also include security devices.



RELEVANT M&A EXPERIENCE

Industry 4.0 (Germany – USA 2018)

Oaklins has advised JENOPTIK AG, an integrated photonics group on the acquisitions of the Canadian company Prodomax Automation Ltd. from Kensington Capital Partners.

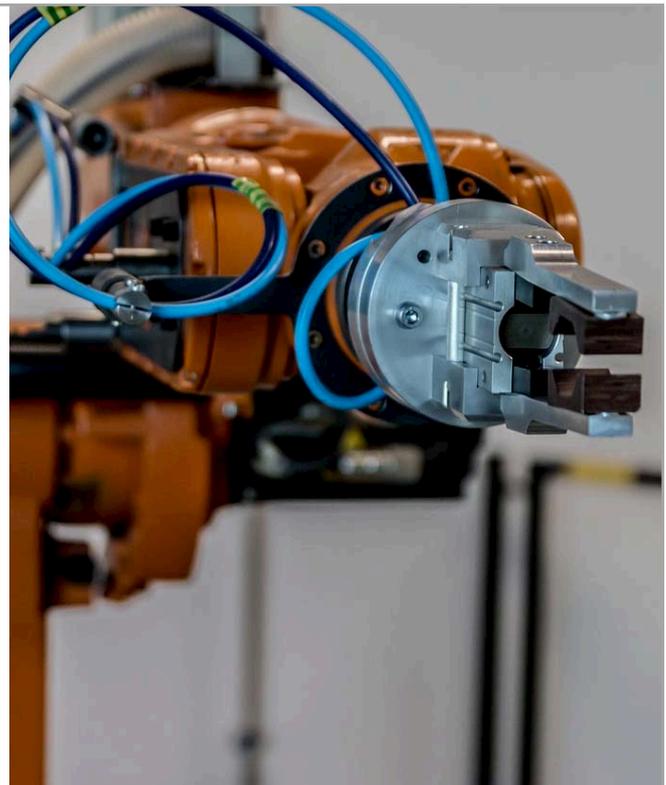
Prodomax, employs approximately 180 people and is specialized in process automation for the automotive industry.



Industry 4.0 4.0 (Germany – USA 2017)

Oaklins has advised JENOPTIK AG on the acquisitions of Five Lakes Automation (FLA), the US-based provider of complex automated manufacturing solutions.

FLA plans and designs automated production lines and integrates them in the customer's production systems.



OTHER RELEVANT M&A EXPERIENCE

QUEST
WORKS FOR ENGINEERS

has acquired

IT
ANALYTICS PARTNERS

M&A BUY-SIDE
TMT

PERMIRA

has acquired a majority stake in

EXCELERANT
BY THE NUMBERS

US\$1.6bn
M&A BUY-SIDE
Private Equity/TMT

dearBytes

has been acquired by

kpn

M&A SELL-SIDE
TMT

SurfRight

has been acquired by

SOPHOS

M&A SELL-SIDE
TMT

VISIONCRITICAL

has sold

Vision Critical's R&C division

to

maru

M&A SELL-SIDE
Private Equity/TMT

PADDYPOWER.

has merged with

betfair

US\$11000m
M&A BUY-SIDE
Consumer & Retail/TMT

MDSL

has been sold to

SEP | SUMERU EQUITY PARTNERS

M&A SELL-SIDE
TMT

MOVENIUM

has been acquired by

VISMA

M&A SELL-SIDE
TMT

DTS
DRIVING THE DIGITAL TRANSFORMATION

has acquired a minority stake in

nelita
SOLUTIONS FOR THE FUTURE

M&A BUY-SIDE
TMT

GraphPad
Software

has completed a majority recapitalization with

INSIGHT
VENTURE PARTNERS

M&A SELL-SIDE
TMT

CORE SERVICES

has been acquired by

SYNTAX EST. 1972

M&A SELL-SIDE
TMT

annodata
wider choice, better advice

has been acquired by

KYOCERA

M&A SELL-SIDE
TMT

adactit
Cloud Productivity to People

has been acquired by

TDC

M&A SELL-SIDE
TMT

metaware.

has been acquired by

gfi
THE DATA PARTNER

M&A SELL-SIDE
TMT

mesan

has been acquired by

netcompany
with **FSN**
EUROPE

M&A SELL-SIDE
Private Equity/TMT

FRANCE
ALYOTECH

has been acquired by

EUROGICIEL
GROUPE

M&A SELL-SIDE
Private Equity/TMT

NETRICS
HOSTED SOLUTIONS

has acquired

in4U

M&A BUY-SIDE
TMT

excelfan

has been acquired by

LUXOFT

M&A SELL-SIDE
TMT

VIAD

has acquired

N200

M&A BUY-SIDE
TMT

Infradata

has sold a stake to

WATERLAND
PRIVATE EQUITY INVESTMENTS

M&A SELL-SIDE
Private Equity/TMT

OTHER RELEVANT FUNDRAISING EXPERIENCE



has completed a Series B-1 round fundraising

FUNDING, DEBT ADVISORY & ECM
TMT



we have advised the company on their financing efforts

FUNDING, DEBT ADVISORY & ECM
Financial Services/TMT



admicom

Initial Public Offering
Nasdaq First North Finland
520 000 shares

US\$6.2m
FUNDING, DEBT ADVISORY & ECM
TMT



has raised funds from Caisse des Dépôts et Consignations and business angels

US\$5m
FUNDING, DEBT ADVISORY & ECM
Consumer & Retail/TMT



has successfully raised financing for the acquisition of Nsecure BV

FUNDING, DEBT ADVISORY & ECM
TMT



Amidar issued bonds in worth of US\$ 260 Million

US\$260m
FUNDING, DEBT ADVISORY & ECM
Real Estate



US\$4m AIM IPO & US\$12m equity placing

US\$54m
FUNDING, DEBT ADVISORY & ECM
TMT



has successfully raised financing

FUNDING, DEBT ADVISORY & ECM
TMT



has raised funds to enable continued growth

US\$4.6m
FUNDING, DEBT ADVISORY & ECM
TMT



Cellcom issued bonds in worth of US\$114 Million

US\$114.4m
FUNDING, DEBT ADVISORY & ECM
TMT



has raised funds from Entrepreneur Venture, Siparex, Star West and BA

FUNDING, DEBT ADVISORY & ECM
Private Equity/TMT



Initial Public Offering

US\$34.3m
FUNDING, DEBT ADVISORY & ECM
TMT



has received an investment from Clairvest to support growth

FUNDING, DEBT ADVISORY & ECM
TMT



has raised equity capital for its US Branch

US\$2m
FUNDING, DEBT ADVISORY & ECM
Private Equity/TMT



has raised funds from Normandie Participations, Alto Invest and NFactory

FUNDING, DEBT ADVISORY & ECM
Business Support Services



Vonetize completed an IPO in worth of \$4 Million

US\$4.1m
FUNDING, DEBT ADVISORY & ECM
TMT



raised an undisclosed amount

FUNDING, DEBT ADVISORY & ECM
TMT



has raised funds by way of a private equity fundraising

US\$7m
FUNDING, DEBT ADVISORY & ECM
Consumer & Retail/Private Equity/Real Estate



SKYLINE ISSUED BONDS IN WORTH OF US\$42 MILLION

US\$42m
FUNDING, DEBT ADVISORY & ECM
Real Estate



has completed a refinancing with Siena Lending Group

FUNDING, DEBT ADVISORY & ECM
TMT

Deep local roots, global commitment



Oaklins is the world's most experienced midmarket M&A advisor, with 800 professionals globally and dedicated industry teams in 40 countries worldwide. We have closed over 1,500 transactions in the past five years.

Our offices around the world



Oaklins Angermann AG

www.oaklins.com/de

Oaklins Germany: Offices in Hamburg, Frankfurt, Stuttgart – and 60 other locations worldwide

Hamburg

ABC-Straße 35
20354 Hamburg

+49 40 34 914-170



Frankfurt

Guiollettstraße 48
60325 Frankfurt



Stuttgart

Bolzstraße 3
70173 Stuttgart



Disclaimer

This report is provided for information purposes only. Oaklins and its member firms make no guarantee, representation or warranty of any kind regarding the timeliness, accuracy or completeness of its content. This report is not intended to convey investment advice or solicit investments of any kind whatsoever. No investment decisions should be taken based on the contents and views expressed herein. Oaklins and its member firms shall not be responsible for any loss sustained by any person who relies on this publication.

Oaklins is the collective trade name of independent member firms affiliated with Oaklins International Inc. Oaklins itself does not provide advisory services.

For details of the nature of affiliation please refer to www.oaklins.com/legal

© 2019 Oaklins. All rights reserved.