

# In Search of Innovation: Exploring the Dynamics of Innovation

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**Abstract**—HMS Industrial Networks AB has been recognized as one of the most innovative companies in the industrial communication industry worldwide. The creation of their Anybus innovation during the 1990s contributed considerably to the company's success. From inception, HMS' employees were innovating for the purpose of creating new business (the creation phase). After the Anybus innovation, they began the process of internationalization (the commercialization phase), which in turn led them to concentrate on cost reduction, product quality, delivery precision, operational efficiency, and increasing growth (the growth phase). As a result of this transformation, performing new radical innovations have become more complicated.

The purpose of our research was to explore the dynamics of innovation at HMS from the aspect of key actors, activities, and events, over the three phases, in order to understand what led to the creation of their Anybus innovation, and why it has become increasingly challenging for HMS to create new radical innovations for the future.

Our research methodology was based on a longitudinal, retrospective study from the inception of HMS in 1988 to 2014, a single case study inspired by the grounded theory approach. We conducted 47 interviews and collected 1 024 historical documents for our research.

Our analysis has revealed that HMS' success in creating the Anybus, and developing a successful business around the innovation, was based on three main capabilities – cultivating customer relations on different managerial and organizational levels, inspiring business relations, and balancing complementary human assets for the purpose of business creation.

The success of HMS has turned the management's attention away from past activities of key actors, of their behavior, and how they influenced and stimulated the creation of radical innovations. Nowadays, they are rhetorically focusing on creativity and innovation. All the while, their real actions put emphasis on growth, cost reduction, product quality, delivery precision, operational efficiency, and moneymaking. In the process of becoming an international company, HMS gradually refocused. In so doing they became profitable and successful, but they also forgot what made them innovative in the first place. Fortunately, HMS' management has come to realize that this is the case and they are now in search of recapturing innovation once again.

Our analysis indicates that HMS' management is facing several barriers to innovation related path dependency and other lock-in phenomena. HMS' management has been captured, trapped in their mindset and actions, by the success of the past. But now their future

has to be secured, and they have come to realize that moneymaking is not everything. In recent years, HMS' management have begun to search for innovation once more, in order to recapture their past capabilities for creating radical innovations. In order to unlock their managerial perceptions of customer needs and their counter-innovation driven activities and events, to utilize the full potential of their employees and capture the innovation opportunity for the future.

**Keywords**—Barriers to innovation, dynamics of innovation, in search of excellence and innovation, radical innovation.

## I. INTRODUCTION

HMS Industrial Networks AB is a Swedish company providing product solutions to connect different devices, such as robots, control systems, motors and sensors, to different industrial networks. HMS has been one of the most innovative companies in their industry. In 1995, they launched their first radical innovation named “Anybus”, and they continued to release new incremental versions<sup>1</sup> (different product families) of the Anybus innovation to this day. A decade ago HMS was recognized as the fastest growing manufacturing company in Sweden by “Ahrens Rapid Growth” and “Svenska Dagbladet” [1]. At an award ceremony in London in 2013, the independent research company “Frost & Sullivan” presented HMS with the “2013 European Industrial Communication Processors – New Product Innovation Award”. The award recognized HMS' new network processor, the Anybus NP40, as the best in class product in a global comparison [2]. During the past 5 years, HMS has experienced an increase of turnover by almost 20% per year, and they are still going strong.

*“Innovation was not so much spoken of in the past, or that people should be encouraged to come up with new ideas. But it is very possible that it was more natural back then, and people just did it. You did not ask anyone if you could do it, you just did it. You felt that it was a good thing to do and beneficial to many people, and you did it within your project. Nowadays, it may be that once you are in a project, they are so structured that you do not do any custom stuff anymore, or take your own initiatives in the same way as you do when you are outside a project. It was probably more common in the past. It might even be that it is more explicit now that you*

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<sup>1</sup> The predecessor to the Anybus innovation was developed for a company named EMS-TOGO in 1994. The first Anybus was named Anybus-IO (1995). HMS developed several Anybus product families over the years. First the Anybus-DT (1995), then improved versions of Anybus-IO and Anybus-DT (1997), the Anybus-S (1998/1999), the Anybus-IC and the Anybus-C (2000/2001), the Anybus-X Gateway (2002), the Anybus-CC (2003/2004), etc.

*are not allowed to put time into this line of work during your projects, because the project should have all the focus.”(HMS development department, 2014, from an employee hired before 2001)*

Innovation came more naturally to employees during the days of yore. The quotation above reflects HMS’ past, when employees were more accustomed to innovation. Employees were able to find the time to experiment during their projects without complaining on the lack of time. When employees did not have to ask for permission from their managers to experiment. It reflects a time when employees did not talk about innovation, but did what they felt was necessary to innovate, and not the other way around. This quotation is likely an indication of a change that has occurred at HMS, concerning the organization [3] and employee behavior [4].

*“I think that our managers want us to be more innovative, and they underline it as something important, but... they do not provide any room for our employees to be creative, any opportunity to be innovative, as I experience it. It is probably related to the fact that we have tight work plans, and we have projects that needs to be completed and tight timelines and deadlines that we need to follow, so there is not much room left to think about anything innovative.”(HMS supply department, 2014, from an employee hired before 2001)*

It is more difficult for employees to exploit their capability for innovation in the present day. The quotation above reflects HMS’ present, how tightly controlled employees are by time sheets, deadlines and work processes, and that they are currently reluctant to innovate. Managers try to motivate their employees to innovate, but employees are unable to find the time or motivation to realize those encouragements.

*“In the past, you were able to go to a developer with a customer problem and get help. Today, more and more often a developer does not have the time to help unless he is ordered to work overtime. Unless the time is scheduled. This does not apply to all developers. Some are still helpful. But more and more people show a lack of responsibility. Some people do not think it’s important if a customer problem is solved to day or the next week. Or if we miss a deadline for delivery. There is no longer the same spirit as it was in the past. The desire to solve customer problems has disappeared to a large extent. This desire has been lost. When a developer says that he needs to be “ordered to work overtime” it sounds more like he does not want to do it, unless he is forced to do it. He is not as eager to solve the problem anymore. But once again this does not apply to all people, but you see it more and more often. Already a few years ago there was more bureaucracy in the company that was clearly visible, which did not exist during the 1990s. More rules we created. Many are good, but several inhibit the freedom of the employee. People have become more 8-16 people who work their eight hours and they do not care about anything during the rest of the day. Such an environment does not encourage innovation.” (HMS, 2014, from an employee hired before 2001)*

Solving customer problems is not as important now as it was during the days of yore. The quotation above reflects a challenge which may affect HMS’ future. It indicates that in recent years more and more of HMS’ employees are losing their desire to solve customer problems, and innovation may inadvertently suffer the consequences. These three observations reflect some of the dynamics of innovation that has occurred over the years at the HMS office in Halmstad Sweden. While their turnover is still increasing, these three observations indicate that something is different today, and it will probably have an undesirable effect on HMS’ capability to create radical innovations for the future.

The question is what has happened in the past that has made some of HMS’ employees disbelieve in their capability to innovate? HMS is still recognized as an innovative company by external parties and they are still creating incremental innovations within industrial communication [2]. However, despite not focusing anymore on creating new radical innovations for new businesses, does HMS still possess the capability to perform radical innovations? Has their ability to innovate been diminished, or has it simply been reallocated? We are therefore interested in performing a retrospective case study of HMS’ history from the aspect of key actors, to learn what activities they engaged in, and what events had an influence on them, which eventually led to the creation of their Anybus innovation, in order to discover if any of those aspects have lost their importance today.

#### A. Purpose

The purpose of our research was to explore the dynamics of innovation at HMS from the aspect of key actors, activities and events, during the company’s entire business development process from 1988 to 2014, in order to understand how the Anybus innovation was created and why creating new radical innovations for the future has become ever more challenging.

## II. FRAME OF REFERENCES

During the first half of the 20th century Joseph Schumpeter argued that “no company can ever retain a position at the top of its industry ... without blazing new trails, without being devoted, heart and soul to the business alone”, and that any company that falls into comfortable routines “will soon be overtaken by aggressive, risk-taking competitive entrepreneurs” [5, p. 161]. Schumpeter’s argument reflects the importance of always being innovative. Because, companies that lose their capability to innovate will soon lose their business to new, more innovative, competitors.

In 1982, Tom Peters and Robert H. Waterman Jr. [6] presented eight attributes that characterized most nearly the distinction of excellent and innovative companies. They argued that what far too many managers have forgotten about what is most important, namely quick action, service to customers, practical innovation, but most importantly, a focus on the people of the company. Peters and Waterman Jr. argued that companies forget what made them successful in the first place, and that causes them to stop being innovative. Because we found their arguments valuable and to the point, they

inspired us to give this paper its current title.

Out of the top 12 companies which made up the “Dow Jones index” in 1900, only one (General Electric) survived to this day [7]. According to Deloitte’s Shift Index, the average life time expectancy of a Fortune 500 company has declined from approximately 75 years (half a century ago) to less than 15 years today [8].

According to Langdon Morris [9, pp.7-8], “[a] study by Richard Foster and Sarah Kaplan calculated the historical death rate for S&P 500 companies and found that at the currently prevailing rate of mortality, a full 75% of 2010’s S&P 500 companies will disappear by 2020. That’s 375 out of 500 companies, which will disappear through merger, bankruptcy, acquisition, or being broken up and sold in pieces.” In this case, not even mergers should be taken lightly, since most, if not all, are only mergers on paper, but hostile takeovers in reality [10]. These studies indicate that neither company nor product is eternal. If companies cannot innovate over time they will inevitably suffer the consequences. History is proof of many such examples: MySpace with social networking [11], Kodak with photography [12], Nokia with mobile phone technology [13], and IBM with personal/mainframe computers [14]. Likewise in the electronics industry, Hitachi, Panasonic, Sharp, and Sony, who were once market leaders, have been losing ground to newcomers. They began to lose ground to Apple and Samsung, who in turn are now losing ground to Xiaomi of China [15]. Companies lose ground and become obsolete because they continue to obsess about what was popular in the past and fail to recognize new customer needs [15]. Other reasons for why large companies become obsolete, is because they lose their capability to capture new customer needs during product development [16]-[18], or because they stop taking risks. They get too comfortable with growth and success, and become unwilling to take on new risky opportunities that may lead to new businesses [19]. Unwilling to risk failing becomes a barrier to innovation. However, many projects fail before one finally succeeds [20]-[23]. People often talk about successful entrepreneurs, such as Steve Jobs, and their success stories. However, they forget that even Steve Jobs failed with products like “Lisa” and companies like “NeXT” [24]. Failing is a natural step in the innovation process.

Risk-taking is crucial for innovative companies to embrace [25]. Innovative companies are those who undertake “somewhat risky ventures”. As a result, they are the ones who “first to come up with proactive innovations” [26, p.162]. Innovative companies are market drivers and creators of radical innovations [27].

As stated by Langdon Morris [9], “while many executives tell us that they’re working on incremental innovations and big breakthroughs,” if observed more carefully, “you’ll see a heavy bias towards the incremental, and a painful shortage of breakthroughs.” Larry Page, the CEO of Google, once stated that “[c]ompanies are doing the same incremental thing that they did 50 years ago, 20 years ago[, and that’s] not really what we need. Especially in technology, we need [radical

innovations], not incremental [innovations]” [28]. However, in order to create radical innovations, companies need to overcome many types of barriers, which hinder them from innovating. Such barriers can be divided into internal and external barriers [29]. Some have been studied for many years. For example, Michael E. Porter presented five barriers to entry [30]. Other (generally) internal barriers can be related to the transfer of knowledge [31], [32], to organizational and environmental conditions and inertia [33]-[36], including manager-employee interactions [37], company policies and regulations [38], and other internal anti-trust measures [39], as well as organizational structures [3] and metaphors [40]. Another example of an organizational barrier is “control”. As companies grow in size they implement control systems to obtain this control, but at the same time, they also lose some of their innovative capabilities. In time, it becomes increasingly harder for these companies to become innovative again [41]. If companies wish to have initiative driven employees who are able to seek out opportunities and pay attention to customer needs, then they need to learn how to give up control without losing control [42]. Managers should also remember that employees working on maintaining existing products can actually be positively motivated (or at least minimally affected) by managerial control that focuses on controlling (and monitoring) their day-to-day activities. However, employees who work on new innovations are negatively impacted by the same control system [43]. Other problems may occur due to biased perceptions, reduced motivations, poor creativity, as well as political and other barriers [16]. Barriers to innovation can also be psychological in nature. They are often described as mental models, related to such things as perceptions of personal desirability, social norms, self-efficacy, and collective efficacy [44]. They can also be related to introversion and extraversion behavior [4, p.580], and internal-external locus of control [4, p.590]. In addition, companies can fall prey to path dependency barriers, from which they may have trouble escaping. Some path dependencies become inefficient to their outcomes, and while regrettable, they may also be costly to change [45], [46]. In the worst case scenario, they may even lead the company into an undesirable lock-in, from which the company may not be able to, at least not easily or inexpensively, break free. Even certain products can create a lock-in situation that may be impossible to reserve [47]. While some studies criticize taking path dependency and lock-in phenomena seriously [48], other researchers still argue that a path dependency can result in a lock-in, that can hold a company back and hinder it from innovating [49], [50].

Despite all the research conducted on barriers to innovation, it still remains increasingly hard for company managers to overcome these barriers. One reason is because “the process of innovation is difficult to manage. It’s risky, expensive, and unpredictable” [9, p.1]. Another reason is because “[m]ost executives ... lack both experience with innovation and they also lack the innovation mindset ... [which] still causes them to look backwards to the past to guide a course into the future. Hence, the mindset problem is largely a matter of focusing on

the wrong thing. ... When the role of management is understood to be managing the business, then 99% (or more) of the effort goes ... to sustaining market share, ... to keep[ing the] organization functioning smoothly and continuing to crank out the profits that lubricate the entire system of business growth" [9, pp.5-6]. And while "[p]rofit depends on efficiency", managers seek out efficiency in order "to stabilize their operations" [9, p.7]. However, as pointed out by Joseph Schumpeter, who considered innovation a process of "creative destruction" [5], the common condition in any company is "change", and not "stability". However, while company managers become trapped "by these intense short term pressures in the form of the need to grow revenue and generate market-rate returns," they often choose growth opportunities that offer "safe options that usually seem predictable, and also look like incremental adjustments. They are considerably less risky than bold innovation bets." All the while they forget that their "competitors who risk big, [also] occasionally ... win big" [9, pp.6-7]. Therefore, in conclusion, company managers who have experienced success for many years, can become captured, trapped in their mindset and actions, by the success of the past.

Peters and Waterman Jr. argued that "the major reason big companies stop innovating is their dependence on ... smooth production flows, integrated operations, big-pet technology planning, and rigid strategic direction setting. They forget how to learn and they quit tolerating mistakes. [They] forgets what made [them] successful in the first place, which was usually a culture that encouraged action, experiments, repeated tries. ... Far too many managers have lost sight of the basics: quick action, service to customers, practical innovation, and the fact that you can't get any of these without virtually everyone's commitment" [6, p.114; p.17]. Fortunately, companies can refocus on the basics and regain their focus on innovation once again, because "[w]hat a firm has done before tends to predict what it can do in the future" [51].

The aspect of actors, activities and events has been identified by previous research. Edwards [52] writes about the creation and sharing of knowledge related to project-based innovations. Edward discusses "how the process through which individuals appropriate knowledge" is affected by crisis events, and how they disrupt social relations between the members of such innovation projects. Edward then discusses how the ability to adopt knowledge is linked to the efforts of actors, and "how actors renegotiate participation in projects and therefore reconstitute the context through which such activities are organised". Markard and Truffer [53] write about the "contributions of actors, or actor groups, to the innovation system performance and dynamics". Caiazza et al. [54] write about interacting multiple forces that deal with social or economic processes, and they present a framework for these forces, "that considers the role of policies, actors and activities for innovation".

As stated above, the aspect of actors, activities and events has been identified by previous research, and it has allowed researchers to discover interesting perspectives. We therefore decided to study the history of HMS Industrial Networks AB

from the aspect of key actors, activities performed by key actors, and external events unaffected by key actors, but which in turn affected key actors and put certain activities in motion. We aimed to gain an insight into when HMS' employees engaged in risk-taking opportunities and capturing customer needs, how it affected the creation of their Anybus innovation, and if any path dependency and lock-in phenomena could be found as a cause for making it increasingly challenging for them to create new radical innovations for the future.

### III. RESEARCH METHODOLOGY

HMS Industrial Networks AB was selected for this study because, Michal Lysek, one of the authors, has been an employee of HMS since 2012. His employment has allowed us to acquire the empirical data that was necessary to perform a more comprehensive understanding and analysis of the company. During our retrospective case study we applied a research strategy of an ethnographic nature [55], using an inductive approach, influenced by grounded theory analysis methods [56], in order to explore the dynamics of innovation at HMS.

#### A. Data Collection Process

Our study covered the years from 1988 to 2014. A total of 47 semi-structured and open-ended interviews were conducted with current and former employees who were employed by HMS between 1988 and 2001. Our interview questions concerned e.g. how people came in contact with HMS, what work assignments they were given, how they perceived the company, how the *company* was organized, and how the company changed throughout the years. Out of the 47 interviewed people, 29 are still employed by HMS, 16 were former employees, one was a former board member, and one was a former customer. A total of 5 062 documents were collected, including financial records, annual reports, company presentations, personnel meeting summaries, and newspaper articles from 1988 to 2014. Afterwards, they were then sorted out to a final set of 1 024 documents.

#### B. Data Analysis Process

From the 1 024 documents and the 47 interviews, 2 510 paragraphs were extracted and coded into three aspects; actors, activities, and events. Out of the 2 510 paragraphs, 151 (6.02%) belonged to actors, 1 757 (70.00%) belonged to activities, and 602 (23.98%) belonged to events.

The 2 510 paragraphs were then coded into conceptual categories based on the information that they contained. The coding process was inspired by methods from the grounded theory approach [10], [57]-[63]. It yielded 16 subcategories, which were then clustered into four main categories; cultivating customer relations, inspiring business relations, improving business and commercialization, and managing complementary assets. All the emerged categories and their subcategories were then sorted chronologically.

When the sorting was completed, three main phases became more clearly visible; the creation phase (1988-1995), the commercialization phase (1996-2005), and the growth phase

(2006-2014). It could then be noted that out of the 2 510 paragraphs, 166 paragraphs (6.61%) belonged to the creation phase, 1 155 paragraphs (46.02%) belonged to the commercialization phase, and 1 189 paragraphs (47.37%) belonged to the growth phase.

Finally, the results were analyzed both periodically, each phase at the time, and chronologically, over all three phases. The periodical analysis focused on the three aspects and how they influenced the four categories and their 16 subcategories. The chronological analysis focused on the four categories with their subcategories and how they changed over time. During the periodical and chronological analysis, additional interviews were performed with the same employees, in order to collect more specific information about the four emerged categories and their subcategories.

#### IV. CASE DESCRIPTION: THE HISTORY OF HMS

##### *A. 1988-1991: Prior to Entering the Industrial Communication Industry*

Nicolas Hassbjer founded HMS Industrial Networks AB in 1988 around a product named MDSS (later renamed to DoubleSense). It was used to measure the thickness of paper sheets. In 1989, Staffan Dahlström joined the company as co-owner. The two entrepreneurs then decided to offer electronics consultant services in order to support the company and the development of the MDSS. The MDSS was first sold to a company named Grafisk Maskinförsäljning AB (GMF), through which HMS got in contact with Atlas Copco Automation AB (1991). The MDSS used fiberoptics, similar to Siemen's SINEC L2<sup>2</sup> protocol [64]. Otherwise they were different communication systems. In 1991, GMF went bankrupt, which resulted in a setback for HMS. In search for new business opportunities, HMS turned their attention once more to Atlas Copco, who were interested in communication systems. In the following years, HMS cultivated close relationships with key actors from Atlas Copco, which opened the door for HMS to the industrial communication industry (1992) and to Hitachi in Japan (1992/1993).

##### *B. 1992-1995: On the Path to Innovation Discovery*

In 1992, Siemens decided to open up their SINEC L2 protocol, allowing other companies to use it in order to communicate with their systems. Phoenix Contact had already done the same with their INTERBUS protocol. If Siemens wanted their customers to buy their control systems in the future, their SINEC L2 protocol had to become an open

technology. However, what turned out to be a business strategy for Siemens, it created a new set of problems for their customers, who were not only buying machines and other devices from Siemens. They had to manage more and more open protocols, which in turn became a business opportunity for companies like HMS.

In 1993, HMS made the impossible possible. Atlas Copco wanted HMS to develop a product that could communicate with Hitachi's proprietary Remote IO protocol. What should have taken 2-3 years for Hitachi to complete HMS finished in 4-5 months with only 5 employees. Afterwards with the help from Atlas Copco and another company named Actron AB (the general distribution agent for Hitachi in Gothenburg Sweden), Nicolas Hassbjer got in contact with several managers from Hitachi in Europe and shortly after Hitachi in Japan (1993). That in turn, with help from Monika Liljenqvist Hermansson, resulted in a first prestigious order from Hitachi (1994). With only 10 employees, HMS had entered the industrial communication industry.

During the 1990's, the number of fieldbus network protocols began to grow at a fast rate, and connectivity became increasingly important [65], [66]. As a result, automation device manufacturers were unable to cover all the relevant industrial networks, which opened up a new market niche for HMS within the industrial communication industry.

At the end of 1994, HMS came in contact with a company named EMS-TOGO. The project which HMS developed for them was very similar to the project which HMS had completed earlier for Atlas Copco. HMS created a small communication module that could be mounted onto a main board. Using this model, only the small module had to be replaced when a different fieldbus network was needed. The main board always remained the same. This module interchangeability is what led to the Anybus concept. In 1995, with only 13 employees the Anybus innovation was born. In the first years when doing business with Japan, HMS mostly offered consultancy services, selling custom communication boards. Anybus sales took time to establish.

##### *C. 1996-1999: Struggling with Production Quality*

In 1996, new EMC (Electromagnetic Compatibility) regulations became mandatory in Europe, due to the European directive 89/336/EEC. That gave HMS the opportunity to help Hitachi to get their PLC equipment EMC certified. In 1997, HMS started to experience an increasing amount of problems with product quality and delivery precision. They realized that they needed a better structure in the company if they wanted to survive through these difficulties. During the same year, HMS decided that they could no longer continue to develop general electronics solutions for other (local) customers. In 1998, they sold their sensor systems (DoubleSense), and in 1999, they put aside their electronics consultancy and began to solely focus on industrial communications.

By the end of the 1990's, the fieldbus technology began to move towards more intelligent networks that were able to transfer more than just control data [65], [66]. However, while users generally did not use all the new features that that this

<sup>2</sup> SINEC L2, which was in 1993 renamed to PROFIBUS (PROcess Field BUS), is a standard protocol for fieldbus communication in automation technology. It was first promoted in 1989 by BMBF (the German department of education and research), and later used by Siemens.

Industrial networks (or field-level networks) are communications networks used in the industry which allow industrial devices to exchange data with each other with the help of specific communication protocols. A communication protocol is the set of rules which a network follows. The protocol explains how information should be distributed over the network. Since different communication protocols follow different rules, they are not by default compatible with each other. Industrial networks are divided into fieldbus networks and industrial Ethernet networks.

technology had to offer, many of HMS' customers were interested in these new features, a fact that HMS took advantage of. In 1999, HMS performed their second issue of shares in order to build up an international company. They resolved their major quality problems by improving product quality and delivery precision. The capital injection also allowed HMS to execute their first growth plan. In 2000, HMS completed its ISO 9001:2000 certification. Rules and procedures began to be formalized as the company aimed to become more professional, and uphold a high product quality. That year, HMS' turnover also doubled, from 33 to 63 MSEK.

#### *D. 2000-2005: On the Path to Internationalization*

In 2000, HMS started working on becoming an international company. In 2002, after four years of negative results, HMS finally reached breakeven. They now had sales offices in Sweden, Germany, USA, and Japan, and their turnover had now reached 97 MSEK.

#### *E. 2006-2014: On the Path to Growth and Making Money*

In 2006, HMS lost a contract with an important customer. That event made them increase their focus on cost reduction, product quality, delivery precision, operational efficiency, and growth. That year, HMS implementing a new growth plan.

In 2007, HMS was publicly listed on the OMX Nordic Exchange stock market. The global financial crisis that occurred between 2007 and 2009 also affected HMS. It devastated both small and well established companies all over the world, leading to the worst recession in 75 years [9, pp.4-5]. Because of that, HMS' turnover dropped from 317 MSEK in 2008 to 245 MSEK in 2009, and it made the company's management increase their focus on growth in the following years. By focusing on cost reduction, delivery precision, product quality, operational efficiency, and growth, HMS became very successful company. They reached 1 000 000 Anybus units sold world-wide that year. In 2009, Staffan took over the role as CEO from Nicolas. In 2013, Nicolas resigned from HMS' board of directors. In 2014, HMS reached 3 000 000 Anybus units sold world-wide.

### V. ANALYSIS

*"I cannot put my finger on what it is, but during the past few years, HMS has fallen into a new phase. Maybe it's because I've been with HMS for so long that I'm able to feel a definite change. Perhaps it is because we are in a strong growth phase again (in terms of staff) and it feels like the rest of us who have been here for a long time are not able to find ourselves in this change. Or it is perhaps that our managers are becoming more and more like real bosses, always cooped up in meetings. I have heard from various sources that many people from our top management team no longer have time to talk to the individual HMS employee, and if you're lucky, you'll get a simple 'hello' as they pass you by, but nothing else. It was different in the past. Maybe this is how things become when a company grows and becomes bigger..."*  
(HMS, 2012, from employees hired before 2001)

The quotation above indicates that HMS Industrial Networks AB has experienced a transformation between 1988 and 2014, and not just in positive terms of growth and success, but also in negative terms of managers decreasing attention to their employees. A number of interviews are supporting this claim. This transformation must have come to pass slowly and gradually, and it transpired over three different phases: the creation phase, the commercialization phase, and the growth phase. Its effects have had a negative impact on HMS' capability to create new radical innovations.

#### *A. The Dynamics of Innovation*

The collected data were analyzed both periodically, each phase at the time, and chronologically, over all three phases. The three phases were created according to the homogeneity of the data in each phase, but they were also influenced by actor-specific activities and external events.

The periodical analysis focused on the three aspects of key actors, activities and events, and how they influenced the four categories and their 16 subcategories, during each phase at the time. The 16 subcategories emerged from the data. They were clustered into four main categories, and they were sorted into each of the three phases. Each of the four categories involved both key actors and the activities which they set in motion. External events were usually not caused by any key actors, but they often influenced certain actors into performing certain activities. However, the results that were obtained from the analysis showed clearly that the three aspects of key actors, activities and events, influenced the three phases differently. Both the creation phase (the first phase) and the growth phase (the third phase) showed homogeneity in its data. The commercialization phase (the second phase) on the other hand showed a transformation period from the first phase to the third phase. The periodical analysis focused on describing each phase as a separate period of time, to gain a deeper understanding of what was of most importance during each specific phase.

The chronological analysis focused on the four categories with their subcategories and how they changed over time, over the three phases simultaneously. The data that we collected showed that HMS was focusing on cultivating customer relations, on inspiring business relations, and on managing complementary assets in order to create value for both their customers and their employees. These three categories helped them improve their capability for innovation. HMS was focusing on improving business and commercialization, which helped them structure their company, in order to reduce costs, improve product quality and delivery precision, and increase operational efficiency and growth. This fourth category helped HMS build a successful company.

Fig. 1 illustrates the results from the periodical and the chronological analysis, and the dynamics of innovation that occurred at HMS over the three phases. Each of these three phases were also divided in the figure into two sub-phases, to illustrate more distinctly when certain actor-influenced activities and certain external events transpired in relation to the four different categories.

### 1. The Creation Phase

During the creation phase, HMS' employees (from HMS in Halmstad Sweden) focused on cultivating customer relations by opportunity capturing, legitimating and customer co-creating (explained further in the chapter on "Cultivating customer relations"). Cultivating customer relations involved key actors, many activities, and certain external events. It indicates that cultivating customer relations was an important ingredient for the company and its innovation process, but so was managing complementary assets which also occurred frequently. During this phase, HMS' managers also put effort into inspiring passion and creativity among their employees by

leading by example and encouraging creativity (explained further in the chapter on "Inspiring business relations"). Inspiring business relations involved both actors and activities. In return, HMS' employees became prone to risk-taking and capturing opportunities for the purpose of business creation and innovation. That in turn led to the creation of the Anybus innovation. When the Anybus innovation was created, HMS had only 13 employees, 6 of which were working in the development department. Out of these 6, only 3 remain employees at HMS today. It means that there are very few people at HMS today who actually know how radical innovations are created.

		Creation Phase		Commercialization Phase		Growth Phase	
Years:		1988-1991	1992-1995	1996-1999	2000-2005	2006-2010	2011-2014
Turnover:		1,300 MSEK	9,300 MSEK	33,000 MSEK	181,000 MSEK	345,000 MSEK	589,000 MSEK
Employees:		3	16	60	100	190	378
		From creating innovation... ..to moneymaking					
Categories	Cultivating customer relations	Legitimizing					
		Opportunity capturing					
		Customer co-creating					
	Inspiring business relations	Inspiring passion and creativity					
						Improving employee wellness	
						Achievement enlightening	
	Improving business and commercialization	Being prone to risk-taking					
		Product passion					
						Business passion	
						Focusing on quality and production	
						Focusing on cost reduction	
						Focusing on growth	
	Managing complementary assets	Complementary personalities					
		Complementary competences					
		Complementary businesses					
	Core businesses	Developing industrial communication systems					
		Electronics consulting					
		Developing sensor systems					

Fig. 1 illustrates the dynamics of innovation at HMS, and how the four emerged categories changed over the three different phases.

### 2. The Commercialization Phase

During the commercialization phase, HMS' employees (from HMS in Halmstad Sweden) continued to focus on customer co-creating as part of cultivating customer relations. However, the importance of opportunity capturing and legitimating began to wear off. The Anybus innovation was already created and HMS began to shift their focus towards product/incremental improvements. Inspiring passion and creativity also began to diminish, as it was being slowly substituted by achievement enlightening (informing employees about how great HMS was as a company, and of all their successful achievements in the past) and improving employee wellness. HMS concentrated more on hard factors (financial results, organizational changes, and products) during this phase, and less on soft factors (key actors/innovation champions and their stories). Managing complementary assets still continued to occur quite frequently. At the same time, HMS began to improve their business and commercialization process. They started to refocus by concentrating on cost reduction, product quality, delivery precision, operational efficiency and growth. They focused on

solving their production problems which occurred in 1997/1998, by stepwise implementing new rules and policies. By the end of this phase, HMS had become a world-renown market leader within the industrial communication industry.

### 3. The Growth Phase

During the growth phase, HMS' employees (from HMS in Halmstad Sweden) had stopped capturing new opportunities that could lead to new businesses. They were no longer prone to risk-taking to the same extent as during the creation phase. First of all, their focus had changed from searching for new businesses to achieving excellence within the industrial communication industry. Second, they could not gamble their business when 200 employees depended on them. The same activities that had led them to the creation of the Anybus innovation were no longer needed. HMS' management was now focusing on cost reduction, product quality, delivery precision, operational efficiency and growth. A focus that was further strengthened after the customer crisis in 2006, and the initial public offering in 2007. New time sheets were introduced, as well as new rules and new internal policies. Actors, activities and events, all concentrated on operational

efficiency and growth maximization.

*“A few years ago we started to see more bureaucracy in the company. More rules were created. Many are good, but several inhibit the freedom of the employee. Bureaucracy did not exist in the past. The decision paths were a lot shorter and we talked to everyone in a completely different way.” (HMS development, supply & marketing department, 2014, from employees hired before 2001)*

As indicated by the quotation above, inspiring passion and creativity diminished even further during this phase. All the while, achievement enlightening and improving employee wellness increased. HMS' managers were no longer leading their employees by example or encouraging creativity to the same extent as they had done during the creation phase.

*“...this kind of spirit, and passion, still exists within the same type of people in the company today, as it did 12-15 years ago, but how can you spread this spirit, this passion, to the newest 100 employees? And it has nothing to do with how skilled you are. You can even be the last employed person in the company. But this key factor is, what you should do to spread that spirit, that passion, to others... How do you spread the best parts of who “we” are to new employees? If you solve this key factor, then you'll probably solve most of our innovation blocking barriers.” (HMS marketing department, 2015)*

Employees hired before the growth phase, still felt passion towards their work and the company, but new employees were no longer inspired to be driven and passionate to the same extent. Passion was replaced by duty and innovation by efficiency. Cultivating customer relations had also diminished during this last phase (referring to HMS in Halmstad Sweden), as it was gradually managed more abroad by HMS' other offices outside of Sweden. Over these three phases, HMS transformed into an established and successful market leader within the industrial communication industry. Their turnover was increasing almost every year, indicating how well HMS' business was growing, but at the same time, their focus changed from innovation to moneymaking.

#### *B. Cultivating Customer Relations*

Cultivating customer relations brought many benefits to HMS and their business. For example, in 1994, HMS was awaiting to receive their first prestigious order from Hitachi in Japan. However, HMS also needed to show that they were ISO-certified, which they were not. Fortunately, through their close relationship with Atlas Copco Automation AB, Nicolas Hassbjer received a letter of recommendation from Pär Johanson, the Marketing Director at Atlas Copco. That letter of recommendation stated that Atlas Copco vouched for HMS and their manufacturing quality. Without that letter of recommendation, HMS may never have received their first prestigious order from Hitachi in 1994, and the door to Japan would most likely have remained closed to them.

#### *1. Opportunity Capturing*

HMS' employees, including the engineers, were focusing a

lot on cultivating customer relations during the creation phase, which allowed them to capture different opportunities. They used state-of-the-art technologies to capture the interest of key customers during the creation phase. HMS used state-of-the-art technologies (at the time), from the 68HC11 microcontroller, to a fiberoptics communication system, to SINEC L2-DP, INTERBUS-S and Remote IO, to cultivate their way from the company GMF in Sweden, to Atlas Copco Automation in Sweden, and finally to Hitachi in Japan. They were cultivating close customer relationships and using state-of-the-art technologies in order to capture valuable opportunities. HMS also agreed to develop complicated projects without knowing if they were able to finish them to begin with. They did so to make sure those opportunities would not slip through their fingers. HMS employees were prone to risk-taking because they believed they could accomplish anything.

#### *2. Legitimizing*

HMS' employees were not afraid of legitimating themselves during the creation phase. They had to prove their worth to their customers, and to gain their trust, but they were only a small company with few employees. They did not have a long list of successful past projects that they could use to prove to their customers that they could trust in them. Instead, they had to apply different methods of legitimating.

HMS employees were not afraid to promise customers to complete a project, even when they did not know if they could deliver on that promise. They listened to what their customers needed, and they promised to develop and deliver. Afterwards, they did their best to try to fulfil those promises. Nicolas Hassbjer and Staffan Dahlström presented HMS as a small company with large resources, but in reality they were not nearly as good as they said they were. Nobody really knew about it of course, thus it worked for them. They were very confident in themselves. They stated that they were the best developers in the business and then afterwards they tried to live up to those claims. This was something of a trademark for HMS during the creation phase. This is not to say that everything HMS developed was perfect.

*“Many of our products were a disaster. You could say that 1/3 were bad, 1/3 were ok, and 1/3 were good. But we did not think so much about the consequences back then. We did not think about what would happen if it did not work. That was not on the map. Of course it would work! We have a completely different mindset today. When we start talking about these things today, the first thing we see are a lot of problems, before we see the possibilities. We must come back to this again. We must open our eyes and see that the front is more important than the back” (HMS administration department, 2014, from an employee hired before 2001)*

HMS only did the best they could, but the truth remained that they were in fact inexperienced as engineers. Nevertheless, because they were cultivating close relationships with their customers, their customers remained loyal to them even when their products failed.



### 3. Co-Creating

When HMS had an agenda to cultivate very strong customer relations, they usually did that with selected key customers. To that effect, they developed a way to influence the relationship with those key customers by using a systematic and triangular model. In the beginning, most people at HMS had many different roles. This model was also hazier than it was clear. However, in time the model became more defined and it helped HMS develop new products in close collaboration with their customers. This model divides HMS employees and customer employees into three types of actors: Enterprising influentials, operations professionals, and technology specialists.

Enterprising influentials are defined as highly influential enterprising people. They can, but do not necessarily have to be, the entrepreneurs who founded the company, like Nicolas Hassbjer and Staffan Dahlström who founded HMS. But they can also be other top managers, or even influential line managers. They can be managers responsible for a specific business units or a specific factory. A CEO is often an enterprising influential. However, the most important role of the enterprising influential is his/her ability to influence other employees from their own unit, department or even within the whole company. Enterprising influentials who do not have the power to make big things happen are not enterprising influentials. Enterprising influentials are also door openers for other people in the organization in a way that rivals operations professionals and technology specialists. They also influence how much their company will do business with other companies. Enterprising influentials are often very important during initial meetings when a company wants to cultivate a very strong customer relation with another company, and they have to not only promote their products but also their own company to the potential collaborator.

Operations professionals are defined as managers who focus on executing daily operations and finalizing business deals. They are very often key-account-managers, but they can also have other management positions. They sometimes use enterprising influentials from their own company to get in contact with the right enterprising influentials over at the customer's company. They usually also take over the daily operations from the enterprising influentials after certain business deals have been initiated. On occasion, they can initiate certain business deals by themselves. However, unless they become enterprising influentials themselves, they will require the help of enterprising influentials from time to time, especially during critical business situations.

Technology specialists are defined as skilled professionals specialized in certain technologies. They are the engineers, and they are the ones who design the final products. Meetings where technology specialists are in focus are usually very technical. They usually discuss details about how to integrate current or future products in the best possible way.

Any one of the three types of actors can represent their company as ambassadors. However, the role of the ambassador is more important for the enterprising influentials and the operations professionals. Key-account-managers are

often company ambassadors, and their role is not only to be the ambassador for their own company to the customer, but also to be the ambassador for the customer to the people within their own company. Ambassadors are gatekeepers in both directions.

HMS often met customers who belonged to all three types of actors. They cultivated customer relations with enterprising influentials in order to promote HMS throughout the customer's organization. Such meetings could start as standard customer meetings with managers (operations professionals) and engineers (technology specialists), but they could suddenly be interrupted by an influential manager (an enterprising influential) who gave everyone at the meeting a clear indication that reaching a collaboration with HMS was exactly what their company wanted. These meetings often ended with technical discussions between engineers from both parties. HMS' enterprising influentials were very skilled at cultivating strong customer relations with people at the customer's company that belonged to all three types of actors.

*"Especially in the beginning of the customer relation, it's important to have these higher ranking enterprising influentials with you, like Nicolas and Staffan, in order to set the scene, represent HMS, and get to know the decision makers within the customer organization. When you have these interfaces in place, then you can start building network relations with different people, and the strongest relations we've had with customers, is when we've had relations on different levels, and when our engineers and their engineers have come so far in their collaboration together, on a daily operational level, solving problems in consensus and unity, that they can just get through everything together, working back and forth, and that is when you have a business relation that really works." (HMS marketing department, 2015, from an employee hired before 2001)*

HMS often strategically involved Nicolas Hassbjer during their first meetings with new Japanese customers. Later when they reached the business stage, other people (e.g. Christian Bergdahl and Jörgen Palmhager) usually took over. They made sure that operations ran smoothly, and that business deals were finalized. This strategy was often used by HMS.

### C. Inspiring Business Relations

#### 1. Leading

During the creation phase, HMS' employees were not just sitting on their hands waiting for things to happen. Both Nicolas Hassbjer and Staffan Dahlström were very proactive. Staffan Dahlström believes that while they were not the best engineers, they wanted to sell what they were able to create. Many entrepreneurs focus on developing business plans instead of selling. Then they hire sales managers to do their selling for them, but the people who are best fitted to sell are the entrepreneurs themselves, because only they are passionate enough about what they are selling. Staffan also believes that while people have great ideas, they usually only say that it's a good idea, but they never invest in it. HMS never knew beforehand that they would succeed in the industrial

communication industry. Nonetheless, they still invested a lot into that business. Especially Nicolas believed in it.

## 2. Encouraging

During the creation and commercialization phase, HMS was enforcing something called “freedom with responsibility”, where employees were given a deadline for a project, and the freedom to decide how to complete it and when they wanted to work on it. This concept stimulated creativity. It allowed employees to successfully manage ideas during their innovation process [67]-[72]. During the creation phase, deadlines were almost holy at HMS. After all, keeping deadlines and releasing products on time can often influence the size of the market which the company is able to obtain [73]. And because HMS accepted any projects given to them in those days, and promised their customers to solve all their problems, HMS’ employees had to push themselves to be innovative in order to make good on those promises.

*“Nicolas and Staffan were very passionate about their company in the past, and it was very contagious. Whenever you got in to work, Nicolas and Staffan were always sitting there. To see them work so much was very contagious and everyone got a special energy from that.” (HMS administration & supply department, 2014, from employees hired before 2001)*

As the quotation above indicates, Nicolas and Staffan were able to inspire their employees to feel passion for their work, and make them all feel like winners. As a result, all employees wanted HMS to succeed. Their work was sometimes stressful and challenging, but it also promoted innovation.

## D.Managing Complementary Assets

In Chinese philosophy, yin and yang is described as conflicting forces, which in reality are complementary rather than opposing. As they interact together, they create a dynamic system, which is far greater than its assembled parts alone. Sometimes in business, creation and innovation the aspect of yin and yang play an important role. In this study, they play the role of complementary assets.

Complementary assets have been described as an important factor for innovation by other researchers as well [74]. In our research, we studied the dynamics of innovation, of how HMS went from creating their Anybus innovation to becoming a successful company that was focusing on growth and moneymaking. What we discovered was that complementary assets (personalities, competences and businesses), all affected the creation of HMS’ Anybus innovation, as well as how these complementary assets changed over time.

## 1. Complementary Personalities

Nicolas Hassbjer and Staffan Dahlström were in many ways both similar and dissimilar. They had complementary personalities. They helped each other to find a balance between their strengths and weaknesses. They found a balance between creating a bond of friendship with their employees and creating a pleasant working atmosphere at the company. Between having a passion for new technologies and having a passion for sales and business. Between being analytic,

thoughtful and long-term strategic and being spontaneous, quick to solve problems and short-term strategic. Between focusing on the future and focusing on the present. Between being diplomatic and being persuading. Between focusing on Japanese customers and focusing on all other customers. Between being involved in what people were doing and giving people total responsibility.

During the creation phase, Nicolas had a higher passion for products than for business. For him the product was primary and the business was secondary. Staffan believed in the product but for him the product was not most important. What he really wanted to do was to build a successful company. During the commercialization phase Nicolas’ attitude shifted, and his passion grew more strongly towards the business, just like Staffan’s passion had done from the very beginning.

## 2. Complementary Competences

HMS’ initial success (1994-1999) on the Japanese market can mostly be credited to Monika Liljenqvist Hermansson and Nicolas Hassbjer. Monika’s role was vital for HMS during the commercialization phase. Monika was hired by HMS because she spoke Japanese. Without her help Nicolas was not able to reach further than to the telephone switchboards in Japan. With the help of Monika, HMS was able to schedule many customer meetings with the right managers before even coming to Japan. And when Monika mentioned that she would attend those meeting with the CEO of HMS, the Japanese culture dictated that they would greet them with influential managers of an appropriate rank. None of that would had been possible before 1999 without Monika’s help.

## 3. Complementary Businesses

During the creation phase, and a few years into the commercialization phase, Nicolas Hassbjer and Staffan Dahlström had to balance several businesses. They had to balance their focus between two main products, and between three different companies; HMS Sensors AB, HMS Electronics AB, and HMS Fieldbus Systems AB. They had to balance their resources between R&D and manufacturing. They had to balance between their need for survival (keeping to old businesses) and risk-taking (going into new businesses).

However, in 1999, HMS decided to concentrate their operations and focus on one single company (HMS Industrial Networks AB) and the promising industrial communication industry. As their passion for business became dominating, they began to focus more and more on cost reduction, product quality, delivery precision, operational efficiency and increasing growth.

## VI. DISCUSSION

In the previous chapter, we presented the analysis results of this study, showing the dynamics of innovation at HMS, from the aspects of key actors, activities and events, partaking over three phases (the creation, the commercialization and the growth phase), focusing on how employees at HMS were “cultivating customer relations”, “inspiring business relations”, “improving business and commercialization”, and

“managing complementary assets”. While “improving business and commercialization” essentially helped HMS to become a successful company focusing on growth and moneymaking, the other three were instrumental in their creation of their Anybus innovation. We therefore focus this chapter on discussing the importance of “cultivating customer relations”, “inspiring business relations”, and “managing complementary assets”.

*Cultivating customer relations:* Employees at HMS were very close to their customers in the past. They were cultivating customer relations and many of their customers became their friends. It started during the creation phase, with Nicolas Hassbjer and Staffan Dahlström, who had close relations with their local customers in Sweden. Later on, Nicolas Hassbjer and Monika Liljenqvist Hermansson started cultivating relations with customers in Japan. HMS expanded to other countries after that. In 1998 they created something called “Indesign Center”. When the Indesign Center was suspended, its activities were taken over by the sales personnel from the newly established sales department in 1999, and the newly established support department in 2000.

Prior to creating the support department, engineers at HMS had direct contact with their customers on a daily basis, but much less after that. Nevertheless, HMS continued to cultivate customer relations during the commercialization phase. During the growth phase (from 2007), employees at HMS started to work in so called GKAM teams. It stood for “Global Key Account Management”. Global key accounts were large and global customers who had offices in many countries.

*“It is with Key Account customers that you can invest time and get to know them better. Sales personnel will not have time to do this with their customers. They have maybe 200 customers while a KAM only has a few main customers.” (HMS sales department, 2015, from an employee hired after 2001)*

GKAM managers were often cultivating customer relations, especially with key customers. In 2013, when the GKAM teams were dissolved, their activities were taken over by the local sales offices in different countries.

*“The GKAM was dissolved because we felt that several of the Global Key Accounts that we had could be developed better if we had a regional approach instead of having a one person at the headquarters in Halmstad Sweden that was globally responsible for each of them. My conclusion is that this has resulted in an improved contact with these customers, but it has also weakened the contact between our developers in Halmstad and these customers.” (HMS administration department, 2015, from an employee hired before 2001)*

The decision to dissolve the GKAM teams may have been a logical strategic decision, but we argue that it may have unfortunate consequences for HMS in Halmstad Sweden from an innovation perspective. It may result in HMS’ employees having a lower innovation capability in the future.

*“Not cultivating strong customer relationships can be very costly for a company.” (HMS sales department, 2015, from an employee hired after 2001)*

Few people would disagree that customers are not important, but few people actually put money where mouth is. They “behave as if [they] don't believe it” [6, pp.73-74]. The reason for that is most easily explained by Harvard psychologist Jerome Bruner, who said “[y]ou more likely act yourself into feeling than feel yourself into action” [75]. The implications are not hard to grasp. People may say that customers are important, but if they are not close to their customers, then their actions will show that they do not really believe in what they are actually saying.

Employees at HMS (in Halmstad Sweden), including non-sales personnel, had close relations with their customers in the past. Today those contacts are managed by local sales offices, far away from their Swedish office. Non-sales personnel have little contact with customers compared to the past. They do not bond with them and make their concerns their own. Even if they say that customers are important, and they help them out in every possible way when products are malfunctioning. Their behavior and concerns indicate that other things are more important, e.g. internal politics.

*“Hitachi, we got to know them on different levels. And not only Hitachi, but later also Yaskawa as well. Even to this day, there are a handful of key people in our industry who are our friends. Those people we knew, who were engineers back then, are managers at the same company today.” (HMS, 2014, from an anonymous employee)*

Being close to customers allowed HMS to go from one customer, GMF, to Atlas Copco, to Hitachi, and then to other customers during the creation phase. Even the creation of the Anybus innovation, that involved both EMS-TOGO and Atlas Copco, was made possible by cultivating customer relations. Being close to customers is something that you can “feel” exists in a company. Quoting Peters and Waterman Jr. [6, p.16], “[d]uring our first round of interviews, we could “feel it.” The language used in talking about people was different. The expectation of regular contributions was different. The love of the product and customer was palpable.”

*“I feel that the problem is that, the larger the company becomes, the more rules and structure the company creates, and then the company loses its customer focus. It happens very seldom today, that people are discussing how to solve something for the customer. But what we are doing is supposed to bring customer value. Instead what people are discussing is how the problem is affecting the individual and the department. That should not even be an issue.” (HMS supply department, 2014, from an employee hired before 2001)*

Peters and Waterman Jr. [6, p.76] argued that “[p]oorer-performing companies often have strong cultures, too, but dysfunctional ones”. They usually focus on internal politics rather than on customer problems. Excellent “companies, on the other hand, always seem to recognize what the companies that set only financial targets don't know or don't deem important. [They] understand that every man seeks meaning”.

*“HMS is still managing customer relations very well today, but not in the same way as we used to do in the past. We all have a lot of work to do on a daily basis to*

*keep track of and develop the running HMS operations, which means meeting customers as part of our daily business is becoming more difficult to do if you do not work within sales. I think we need to consider "HOW" we can be more pro-active in the area of "business development" outside the sales organization, and "HOW" to think about new possibilities when we have trouble 'keeping our heads above the water' with daily operations, product design and maintenance?" (HMS, 2015, from an anonymous employee)*

They also argued that excellent companies involve all employees, including their scientists, into having close relationships with their customers, because many studies have shown that most innovations "come from small bands of zealots operating outside the mainstream" [6, pp.115-116]. This is what HMS has come to realize as well, as shown by the quotation above and now they want to become more proactive in the area of business development.

Fig. 1 illustrates that while legitimating, opportunity capturing, and customer co-creating, was important for cultivating customer relations during the creation phase, they began to diminish in importance during the company's transformation into the growth phase. As a result, HMS began to lose some of their capabilities that once influenced the creation of their Anybus innovation.

*Inspiring business relations:* Besides cultivating customer relations, HMS managers were also internally inspiring business relation amongst their employees in the past. In those days, managers did not have a bias for action. It means that they were prone to going out there to try out new things. "Just as you don't learn anything in science without experimenting, you don't learn anything in business without trying, failing and trying again" [6].

*"We thought we were best in the world in developing technology, but in truth, we were really lousy. We had an awfully good confidence in ourselves. Totally unmotivated good confidence." (HMS development department, 2014, from an employee hired before 2001)*

*"We were not thinking that much about what would happen if we did not manage to solve the customer's problem. That was not even an option. We were sure we would make it work. Why would we not? We had a completely different mindset back then. When we start to talk about things today, the first thing we see is a lot of problems, before we see the possibilities. We must come back to how we did things in the past, where the front was more important than the back." (HMS administration department, 2014, from an employee hired before 2001)*

As the above quotations indicate, employees at HMS were far more prone to risk-taking in the past. As engineers, they were very confident in themselves. They thought they were the best. They thought of themselves as winners. They eagerly accepted projects that customers offered to them. They did not think they could fail. They saw possibilities rather than problems. Their commitment is proof that they were eager to solve customer problems. Nicolas Hassbjer and Staffan

Dahlström were leading by example, and using legitimating to convince customers to trust in HMS.

*"Staffan Dahlström helped us out a lot in the past. He was really good as a sounding board. When I got stuck during a project, I asked Staffan to help me out, and he sat with me maybe for an hour or so. I explained the problem and he responded with many counter questions, which helped me solve the problem in the end." (HMS development department, 2014, from an employee hired before 2001)*

*"Nicolas and Staffan could easily be standing next to us, working on something, maybe fixing the printer because it was not working... We would probably not see anything like that happen today, but back then it was not a problem for them." (HMS, 2014, from an employee hired before 2001)*

As mentioned by Peters and Waterman Jr. [6, pp.70-71], "walking the floor" is important to ignite the motivation and passion of employees. Nicolas Hassbjer and Staffan Dahlström often walked around, helping people out when it was necessary. Showing interest, talking to employees, and asking how their work was progressing. All of that was very motivating. Granted that it was easier in the past when HMS had fewer employees, but that is not an excuse for neglecting it today.

*"Everyone is so very busy nowadays, even the managers. Managers at HMS are probably more 'bosses' now than what they were in the past. Too busy writing reports, and not having the time to talk to us employees anymore." (HMS, 2014, from employees hired before 2001)*

Peters and Waterman Jr. [6, pp.70-71] also stated that "[w]hen you think about it, with management's time being as scarce as it is, that form of reinforcement may be the most powerful of all." We fully agree. Managers should "walking the floor" because from an innovation perspective, that might be the most beneficial way to get people to become more innovative. Another aspect that HMS is not focusing on today is celebrating their champions, especially by using story telling. Peters and Waterman Jr. [6] (pp.xxxi-xxxii) stated that excellent companies are abounded in "stories and imagery". That they had a "dominant use of story, slogan, and legend as people tried to explain the characteristics of their own great institutions" [6, p.75].

Burrhus Frederic Skinner was the leading psychologist in behaviorism. He "believed that society could harness the power of the environment to change behaviour in beneficial ways. B.F. Skinner believed that the real causes of behaviour reside in the outer world and insisted that 'A person does not act upon the world, the world acts upon him'." [4, pp.250-254].

The most important contribution from B.F. Skinner was his theory on positive reinforcement, about rewarding people for tasks well performed. "In short, negative reinforcement will produce behavioral change, but often in strange, unpredictable, and undesirable ways. ... Positive reinforcement causes behavioral change too, but usually in the

intended direction.” It educates people, enhances their own self-image, and creates winners. However, regular reinforcement loses its impact when it comes to be expected. Thus, unpredictable reinforcement works better. Small rewards are also more effective than large ones, as they become a cause for positive celebration rather than the focus of a negative political battle [6, pp.68-71].

Positive reinforcement can be used to create “winners”. Therefore, Peters and Waterman Jr. [6, p.58] argued that systems “in the excellent companies are not only designed to produce lots of winners; they are constructed to celebrate the winning once it occurs.” However, they also stated that in poorer-performing companies “[l]osing instead of winning is the norm, as are negative rather than positive reinforcement, guidance by the rule book rather than tapestries of myths, constraint and control rather than soaring meaning and a chance to sally forth, and political rather than moral leadership” [6, p.86]. The reason for that is because most managers know very little about positive reinforcement. Some do not value it at all, or consider it beneath them. However, “[t]he evidence from the excellent companies strongly suggests that managers who feel this way are doing themselves a great disservice” [6, p.70].

Fig. 1 illustrates that while inspiring passion and creativity was important for inspiring business relations amongst employees in the past; it was replaced with improving employee wellness and by achievement enlightening (e.g. telling everyone how great HMS was in the past). As a result, HMS’ managers are not inspiring business relations to the same extent as before the growth phase.

*Managing complementary assets:* Managing complementary personalities, competences and businesses, also influenced HMS capability for creating the Anybus innovation. It was through complementary businesses that HMS discovered the new field of industrial communication, and it was through complementary personalities and competences that HMS managed to grow their businesses. However, managing complementary assets has also lessened over the three phases.

## VII. CONCLUSION

As shown in Fig. 1, there were three phases in HMS’ history: the creation phase, the commercialization phase, and the growth phase. However, we could also argue that there were in fact only two main phases and one transition phase. The transition from the first main phase (the creation phase) to the second main phase (the growth phase) illustrates the dynamics of innovation that occurred in HMS’ past. It illustrates how HMS’ employees lost some of their capabilities for innovation, but also how they became very successful, by focusing on growth and moneymaking. Fig. 1 also illustrates that HMS (in Halmstad Sweden) is not cultivating customer relations to the same extent as they did in the past. Local offices in other countries have taken over much of those responsibilities, and left the employees at Halmstad Sweden, especially the non-sales personnel, with much less customer contact. Internal politics are often a greater concern among

employees than helping each other to solve customer problems. Keeping deadlines is no longer as important. HMS employees don’t experiment with state-of-the-art technologies in order to capture the attention of key customers. They are not capturing opportunities in the same way as they did during the creation phase. One of the reasons might be because very few people exist at HMS who actually experienced the creation of the Anybus innovation. Few know what that truly means. HMS’ employees also had a different focus in the past. Their vision was that the Anybus should exist in everything. They were not afraid to promise customers to resolve any problem they might have. They saw possibilities rather than problems, and they pushed themselves to be innovative in order to make good on those promises. They had a mindset that nothing was impossible.

Fig. 1 illustrates that HMS is not inspiring business relations to the same extent as they did in the past. Managers are not “walking the floor” and talking to employees as they did in the past. HMS is not managing complementary assets either to the same extent as they did in the past. Now that Nicolas Hassbjer is not active in the company any longer, who then is complementing Staffan Dahlström, the confident and experienced businessman, balancing his drive for business with a drive for innovation? What people in the company are managing complementary assets for the purpose of supporting the company in the creation of new radical innovations?

The dynamics of innovation illustrates how HMS’ employees searched for innovation in the past, and after creating the Anybus, how they began to transform the company by refocusing on growth, operational excellence and moneymaking. In the process, they lost some of their capabilities to create radical innovations. But now their future has to be secured, and HMS’ management has come to realize that moneymaking is not everything.

Since 2014, HMS’s managers are in search of innovation once again. They are refocusing, in order to recapture their past capabilities for creating radical innovations for the future. They are refocusing on the basics: on cultivating new customer relations, on inspiring new business relations, and on managing new complementary assets.

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