Preface

At Erasmus MC, we are focused on our societal impact through translating our vision and mission, as described in our “Course 18” 5-year strategic plan, into practical everyday improvements in care “for our patients and for the population in general; now and in the future”. Our scientists regularly contribute to this mission and vision by discovering new innovative ideas that can be implemented in day-to-day patient care, as well as fundamental new insights and inventions that could be the foundation for a new treatment or smart prevention. The Technology Transfer Office (TTO) of Erasmus MC is supporting all of these developments in order to create impact, both socially and economically.

The transformation of the ‘new’ TTO already saw impressive results in 2015, which only improved in 2016.

Besides this success, we also noticed that TTO is shifting and broadened its focus to a more outward-facing approach, which allows them to apply the knowledge and experience of its experts in many more fields within Erasmus MC.

The Executive Board of Erasmus MC is extremely pleased with the increased attention towards commercialization and creating impact from the scientific results of the Medical Facility.

All in all a very positive picture of TTO and I am confident that 2017 will, yet again, turn out to be an interesting year for TTO with many new inventions that —after fine-tuning— might generate great impact for the scientists, Erasmus MC and society.

Prof.dr. Jaap Verweij, Dean / vice-chairman Erasmus MC
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Some major achievements in 2016

>> UNIIQ BV was launched, a Proof of Concept Fund of €22 million based on a collaboration between Erasmus MC, TU Delft, Leiden University, Innovation Quarter and supported by EFRO.

>> Swanbridge Capital BV was launched, a Proof of Concept Fund of €6.5 million based on a collaboration between Erasmus MC, van Herk Investment, Municipality Rotterdam and supported by Ministry of Economic Affairs.

>> Harbour Antibodies BV, a spin-off from the research activities of Prof. Frank Grosveld was sold in a cash- and equity-deal to a conglomerate of Chinese investors and will continue its business under the name Harbour BioMed.

>> The Municipality of Rotterdam agreed to subsidize the start-up of The Health Hub, a new branch to our Incubator activities, fully dedicated to innovations in care. This initiative is supported by Erasmus MC, Erasmus University, Rotterdam Innovation District and Valad.

>> TTO managed to create over €11 million of Additional Added Value for different departments in Erasmus MC.

>> Medaned B.V., a spin-off, was established by means of a know-how and copyright license.
1. Intro

2016 was considered, yet again, a prosperous year in the history of Erasmus MC TTO. While 2015 showed an exponential growth in production, the feeling was that 2016 would show this growth levelling-off, allowing the team time to implement the newly increased levels of production in their work processes, but that did not happen!

Although this growth has tapered off to some degree in comparison to 2015, Erasmus MC TTO still showed substantial growth in 2016 in low double digits for a number of Key Performance Indicators (KPIs). This stimulated the need to make adjustments in the structure of the TTO organization. The team grew from 16.5 FTE at year end 2015 to 21.6 FTE at year end 2016 (excluding Erasmus Holding B.V.). As we had not foreseen the extensive further growth in our workload during 2016, the growth in personnel was lagging behind in comparison to the workload for most of the year. This was especially evident in the Legal Team where the increased workload was excessive (Figure 1). As a result, it became difficult to find the right balance between managing the workload and providing a good service. The workload and services were more balanced for the Business Development Department (BD team).

*Figure 1: Performance in numbers*

![Performance in numbers](image)

*Figure 1 shows this rapid increase in the workload of TTO by the number of Invention Disclosures (IDs) that were handled by the BD team and the number of contracts handled by the Legal Team. The number of other advisory services, including but not limited to conflict handling, negotiations, etc. which is also provided by the legal counsels was not available at the time of publishing, and therefore not incorporated in this figure. As expected, the number of license agreements signed in 2016 did not increase as much as the other indicators, because typically a lot of work needs to be completed both by the BD team and the inventor, which may in some cases, take years to complete before an ID matures into a license agreement. Therefore we expect that the number of license agreements will clearly increase in the coming years as a consequence of the increased number of IDs.*
After two years of investing in the general awareness of TTO, we have become a well-known department within Erasmus MC. The number of awareness sessions has stabilized, and the style of these sessions has changed from general introductory classroom presentations towards more cooperative Q&A-styled workshops and educational sessions with PhD-students and post-docs.

Interestingly enough, the focus of the communication has shifted from internal awareness sessions towards externally oriented activities, including participating in both national and international conferences. We assume that this is not only a direct consequence of our own strategy, but also because TTO has actively adopted a more external oriented position and is therefore more visible to external parties.

Furthermore, TTO has vested more energy in its undergraduate educational programs and is collaborating with the directors of the different Master programs to include awareness for intellectual property (IP), innovation and impact in the curriculum.

All in all, one of the main outcomes of all these awareness sessions, educational programs and one-on-one discussions is that TTO is able to create a more realistic view of the commercial value of Erasmus MC's inventions, both internally and externally, since the professional self-reflection creates a better standing position that may lead to a level playing field with (commercial) partners. This insight does not always have to lead to more income, or higher royalties, but can also result in a better alignment with a partner and therefore a smoother implementation of collaborative results in a product or a service.

Another new element to increase the external awareness of innovation initiatives from Erasmus MC was our cooperation in “Healthy Ideas, Healthy Returns”, a collective initiative from all University Medical Centers (UMCs) together with the National Cancer Institute and the Hubrecht Institute to organize a pitch event for potential spin-offs for an audience of health related VCs in The Netherlands. Erasmus MC participated with one initiative for this first edition.

Our LinkedIn page is also gaining momentum with over 250 followers at the end of 2016. Communicating through the LinkedIn platform allows us to reach both employees and external parties though regular posting of relevant content.
Table 1: Exposure

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal awareness sessions</td>
<td>4</td>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>(Inter)national visits and meetings hosted</td>
<td>5</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Networking events</td>
<td>5</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Conferences attended</td>
<td>2</td>
<td>19</td>
<td>46</td>
</tr>
<tr>
<td>(Inter)national Presentations</td>
<td>0</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

An overview of TTO’s activities are summarized in Table 1.

Internal awareness sessions: These sessions are the foundation of the in-house positioning of TTO where both legal and business development professionals at TTO explains what the department does, and how we can support Erasmus MC employees. These sessions are tailored for each specific audience and are held by means of various types of meetings such as individual introductions, student classroom lectures as well as research- and departmental meetings. In 2016, we created new sessions that focus on PhD-students and Post-docs.

(Inter)national visits and hosted meetings: TTO’s increased visibility often allows us to represent Erasmus MC during (inter)national visits and usually takes place at the Erasmus MC Incubator at the Rotterdam Science Tower (RST). We have seen that there is a clear demand from international organizations to visit the Incubator and to learn how Erasmus MC has set up and manages its Incubator activities.

In 2016, delegations from Singapore, the Municipality of Rotterdam and the Ministry of Economic Affairs, including the Vice-Minister and the Director-General, visited Erasmus MC Incubator. Furthermore, we arranged tours in the RST for the management of the Port of Rotterdam, the management team of our Erasmus MC ‘Servicebedrijf’, Start-up Delta and the Board of Directors of Erasmus MC, who visited TTO and the Erasmus Incubator as part of their ‘Over de Vloer bij...’ tour.

Networking events: We also organize events where scientists, companies, start-ups and governments, who are all key in the commercialization process, meet and have the possibility to exchange their views and ideas.

In 2016, we organized the “New Business Meets Science” and “Watertech Meets Science” events as well as two meet-and-greet lunch events for the companies housed in the Incubator and for partners of the Rotterdam Science Tower.

The Erasmus MC Incubator also opened its doors during the “Europa Kijkdag”, where it was promoted as one of the “Signature Projects of the Year”.

Conferences attended: An important activity for TTO is to present and pitch inventions from Erasmus MC at (inter)national conferences. These are important opportunities for TTO to meet potential licensees and partners. Good examples are the two BIO-Europe conferences that we visited in Stockholm and Cologne.

We also volunteered for professionalization support from PROGRESS-TT, an EC-funded organization, for capacity building of the Technology Transfer profession throughout Europe. After an in-depth evaluation of Erasmus MC’s TTO, we were invited to get professional support to strengthen our capabilities and position. We are currently half way through the two-year support program.
(Inter)national Presentations: TTO was invited to present at a number of international events including the Board of EIT Health, the Organisation for Economic Co-operation and Development (OECD) site visit, the Prime Minister’s Office of the United Arab Emirates, the Ministry of Innovation of Taiwan, the Business Club of Erasmus MC and the International Biomedical Entrepreneurship course in Boston.

“The healthcare of tomorrow depends on the science of today. However, for successfully translating fundamental findings into improved health and other societal benefits a dedicated TTO, as that of the Erasmus MC, is indispensable.”

Prof. dr. J.H.J.Hoeijmakers – Molecular Genetics
Subsidies and Non-Core activities

>> **Octrooifonds** is an Erasmus MC fund (€100,000) for internal investments in Intellectual Property. The budget for the Octrooifonds comes from the Licentiefonds and is meant as a subsidy that covers 50% of the initial costs for a patent application. When a patent is licensed or leads to revenues for Erasmus MC, this fund is reimbursed. The number of new patent applications has increased enormously leading to reduced funds left in the Octrooifonds. In 2016 we reimbursed €167,000 instead of €100,000.

>> **Licentiefonds** is an Erasmus MC fund collecting any and all income (royalties, milestone payments, etc.) related to technologies that are currently out-licensed. This fund is administrated by TTO, but controlled by the Dean. Its income has previously been used for special projects, such as funding of the Erasmus MC Incubator. In 2016, UNIIQ and Swanbridge Capital were financed from the Licentiefonds.

>> **EFRO I** is a subsidy allocated by the European Fund for Regional Development and is used partly to fund the Erasmus MC Incubator in the Rotterdam Science Tower. While the subsidy period ended by the end of 2015, Erasmus MC has the obligation to maintain the Incubator until at least September 2022. TTO executes the management and administration of the Incubator.

>> **EFRO II** is a subsidy, allocated by the European Fund for Regional Development. In 2016, we elaborated on a proposal to support start-ups in the very early stages. This proposal aimed to breach the evident gap between the “entrepreneur with a good idea” and the actual definition, description and set up of a business plan that can be used as a pitch document to reach out and obtain funding. The ‘Kansen voor West’ authorities support our grant application.

>> “**Valorisatie Programma Rotterdam**” (VPR) is a consortium of, among others, Erasmus University Rotterdam, InHolland, Hogeschool Rotterdam, Albeda College and Erasmus MC, which runs from 2012 until 2017 with the goal to disseminate knowledge from the knowledge institutes to society. The Ministry of Economic Affairs subsidized the Valorisatie Programma Rotterdam with €5 million for the first four years (2012 - 2015).

Although the Board of Erasmus MC is responsible for this program, TTO is requested to define and implement the activities that the board has accepted and agreed upon. These activities span a wide range from scouting and screening to commercialization of innovations in care. In 2016, the subsidy was finalized with a visit from the evaluation committee, which concluded that the VPR turned out to be an outstanding example of a subsidized program. The program’s success is seen as overall positive not only due to the established collaboration between the university, medical school and high schools in Rotterdam, but also because the relations with the laboratory school and the municipality were enriched by the program. Since we foresee the continuation of this collaboration, the Board of Erasmus MC has requested TTO to acquire additional resources to maintain the program. The impact of this program is already visible as the management of this program is now a core part of Erasmus MC’s TTO.
**Toekomstfonds** is an interest-free loan, allocated by Netherlands Enterprise Agency (RVO) to build or improve research facilities. Erasmus MC, through the support of TTO, successfully applied for a € 4.2 million loan for the additional construction to a newly planned animal facility. This facility would allow interim accessibility to internal and external start-ups and businesses to execute animal experiments in a dedicated environment, and to benefit from our professional support and know-how. The total costs for this new animal facility will be € 60 million.

**TKI allowance** is a subsidy program initiated by the Netherlands Enterprise Agency through Health-Holland, aimed at stimulating private public collaborations. This program allows scientists to get additional funding based on the private contribution to the collaboration. A condition for the additional funding in this program is a collaboration agreement with, inter alia, an intellectual property clause that is fair to both parties. TTO decided to support scientists in applying for this allowance by actively screening contracts, informing scientists about the existence of the program and structuring the collaborations to become eligible for the allowance. In 2016, we successfully applied for € 1.321.438 TKI-allowance (see also Chapter 4.4).

**Standard Operating Procedures** TTO coordinated the finalization of a set of Standard Operating Procedures. In 2016, the Board approved the last two policy documents of the financial and non-financial SOPs for Erasmus MC: The “Stock Ownership” Regulation and the “Protection and Commercialization of IP from the Erasmus MC” Regulation, as recommended by Stafconvent and the Employee Council. Together with the “Financial Conflict of Interest Policy” and the “Side-activities” clauses in the CLA (Art. 9.3), Erasmus MC now has a full set of financial and non-financial policy documents leading to SOPs (see also chapter 4.2 and 4.3).

“The proactive and tenacious attitude of our knowledgeable TTO colleagues resulted in several very good deals with the industry that we could never have accomplished without their support.”

Prof. dr. P.A.E. Sillevis Smitt – Neurology
2.1 Business Development

Continuing on the foundations of 2015, we have been able to further professionalize the Business Development team and our processes. The KPIs in Table 2 show a decreased number of spin-offs, licenses and license income. This is mostly due to the fact that at the start of 2015 there was still a significant backlog in many activities that have been resolved over the course of that year. At the start of 2016, the backlog had been fully resolved and the overviews only contain new cases (see also chapter 2.1.2).

Table 2: TTO-Business Development KPIs

<table>
<thead>
<tr>
<th>Key Performance Indicator</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>Increase 2015 - 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invention Disclosures (IDs)</td>
<td>40</td>
<td>96</td>
<td>113</td>
<td>18%</td>
</tr>
<tr>
<td>IDFs Signed</td>
<td>12</td>
<td>23</td>
<td>34</td>
<td>48%</td>
</tr>
<tr>
<td>Patent Applications</td>
<td>9</td>
<td>14</td>
<td>20</td>
<td>43%</td>
</tr>
<tr>
<td>Patents Granted</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>-17%</td>
</tr>
<tr>
<td>Total Patents in Portfolio</td>
<td>113</td>
<td>61</td>
<td>80</td>
<td>*</td>
</tr>
<tr>
<td>New Licenses</td>
<td>8</td>
<td>17</td>
<td>11</td>
<td>-35%</td>
</tr>
<tr>
<td>Royalty Income</td>
<td>€ 440.000</td>
<td>€ 507.865</td>
<td>€ 392.624</td>
<td>-23%</td>
</tr>
<tr>
<td>Additional Added Value</td>
<td>NA</td>
<td>€ 3.135.770</td>
<td>€ 11.515.425</td>
<td>267%</td>
</tr>
<tr>
<td>Spin-off companies</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>-50%</td>
</tr>
<tr>
<td>Total agreements reviewed</td>
<td>720</td>
<td>979</td>
<td>1171</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 2 shows the general outcome of the Key Performance Indicators of TTO Business Development. Legal will be subdivided and elaborated in chapter 3.

The number of IDs has grown, and with that also the number of signed Invention Disclosure Forms (IDFs). We are pleased that we were able to retain the critical review of the potential impact of the ideas in the signed IDFs, as only about 2/3 of them resulted in a decision to file an actual patent application. A critical view from TTO on what should and should not be patented, will improve the impact when it comes to licensing and royalty-income in later years, because there is a better focus on these topics.

In 2016, we have been able to further grow the Business Development team with a dedicated person for the “Valorisatie Programma Rotterdam” and two temporary hires for other specific projects such as a STW Demonstrator project and the licensing of biological materials, which includes mouse models and cell lines. The total number of FTE in the Business Development team ultimo 2016 was 6.9 compared to 5.8 ultimo 2015.
is still unknown to what extent inventions from the Erasmus MC are patented by companies or other institutions in their own name.

Finalizing a license agreement may take a long time, since it, among others, depends on the publication of the patent, the search report of patent applications, and prior art search. Therefore, it is difficult to link the growth in number of IDs to the number of licenses at this point in time. We assume that in the coming years the number of licenses will increase as more patents become available for out-licensing.

The royalty-income decreased with 23% in 2016, which is mostly due to extra income that was generated in 2015 after active auditing of historic licenses and a backlog in license payments.

Additional Added Value made a huge jump as we were able to offer our services to a wider group of scientists. This activity is now supported by TTO as a general service, but it remains the question whether it must be implemented in our service portfolio, as it is in principal not a core activity of TTO (see also Outlook 2017).

“**TTO** has shown to be a very active, professional and motivating partner to work with. It feels like we take the whole route from research to potential commercialization in the future of our sub-cellular immunomodulation project together.”

*Dr. M.J. Hoogduijn – Internal medicine*
Figure 2: Distribution of Business Development activities per Theme

Figure 2 illustrates how many activities TTO has initiated per theme (blue bar), relative to the size in FTE per theme (squares) and to the number of expected cases per theme (purple bar) based on the number of FTE relative to the “Total Active Cases” (green bar). Furthermore, Figure 2 also shows the total number of active cases per theme.

It is evident that a Theme involved in a lot of fundamental research, such as “Biomedische Wetenschappen”, will have close contacts to TTO relative to the size of the Theme (in FTE). It is expected that this will continue to be the case, since fundamental research, in general, often needs the support from TTO to better understand the commercial impact of the research outcome next to the scientific impact.

A remarkable change that has occurred in 2016 is the significant increase in activities of TTO for Theme “Diagnostiek en Advies”, which is also seen for Theme “Dijkzigt” and Theme “Sophia”. The increase in cases for Theme “Sophia” could be attributed to our extensive collaboration with their research support office to create awareness of the supporting services provided by both of us, which has translated into more requests for assistance from scientists.
2.1.1. Promotion of licensing opportunities

TTO promotes its activities through promoting our non-confidential disclosures (NCDs) of all the technologies available for licensing digitally (EBD partnering platform, Flintbox and the TTO website), in person via conferences such as the BIO-events and on our “wall of fame”, which has grown steadily and was completely filled by the end of 2016.

We also actively match potential partners and technologies with each other.

2.1.2 Follow-up on license agreements

As a result of our efforts in 2015 to actively follow-up and remind our licensees of their obligations in relation to the license agreement, we have seen a significant improvement in the reporting in 2016. It is expected that the number of total active license agreements will increase per year along with the time required to actively monitor the incoming reports, review the data provided as well as the associated follow-up and invoicing. Although this was still manageable in 2016, the team will have to review its processes and potentially develop new ones in 2017.

2.1.3 Additional Added Value

In some cases, TTO is able to provide advice and support on negotiations that are not considered typical IP agreements. When TTO is successful in improving the financial terms for such a deal, this financial upside is counted as Additional Added Value.

The significant increase in added value clearly indicates that a large number of departments as well as researchers are undervaluing their research and the commercial impact thereof.

The support of the TTO Business Development Managers resulted in a total of € 11.5 million, which is almost a threefold increase compared to the first year these services were executed. It is feasible to conclude that researchers would greatly benefit from this support in negotiations. This can also be aided by explaining and training our inventors on how to negotiate successfully with external parties. By creating awareness about the value of their research and providing support in the discussions, a more balanced deal is frequently obtainable.

2.1.4 Types of licenses signed

TTO has entered into a total of eleven new license agreements during 2016. These licenses showcase the diversity of the technologies that TTO is transferring to the market as they include, amongst others, mouse models, cell lines, questionnaires, anatomy related know-how, research tools and biomarkers.
2.2 Proof-of-Concept Funds

2.2.1 UNIIQ

In June 2016, Erasmus MC, together with Leiden University, Delft University of Technology and Innovation Quarter (the regional development agency), launched a new proof-of-concept investment fund named UNIIQ. With an amount of € 22 million, UNIIQ helps companies to bridge the proof-of-concept phase and support these companies in obtaining follow-up funding. Using a convertible loan of € 300,000, UNIIQ aims to get through the so called ‘valley of death’ that so often occurs for early stage (academic) companies before they can acquire venture capital.

TTO has been active for over two years in the creation of UNIIQ in a close collaboration with the TTOs of Leiden and Delft to come to such an exclusive partnership. TTO cooperates providing the experience of an Investment Manager, who is a member of the UNIIQ-team.

2.2.2 Swanbridge Capital

Swanbridge Capital, a very early stage Proof-of-Concept fund established by Erasmus MC, Van Herk Investments and the Municipality of Rotterdam in 2016. Swanbridge Capital invests in early stage companies using its €6.5 million fund. Typically, Swanbridge Capital will obtain a significant equity-stake in the company and will actively support the management team in the further development of the company. By creating clear ‘killer-experiments’ and providing the early stage company with both advice and a network of subsequent financers, Swanbridge Capital aims to add significant value to the companies themselves, as well as the development of these companies in the Rotterdam life sciences sector. Erasmus MC TTO has played an important role in the set-up of this Proof-of-Concept fund. Through the Erasmus MC Holding B.V., Erasmus MC has invested in the fund and helped to obtain an additional loan from the Dutch Ministry of Economic Affairs.
2.3 Legal

2.3.1 Guidance and support for the scientific staff
The legal counsels of TTO provide guidance and support for the scientific staff of Erasmus MC with their contacts with the industry and institutions that grant research subsidies. We also advise researchers on research projects in collaboration with other national and international research institutions, provide expert advice in the field of intellectual property law and we handle conflicts with industry or claims from third parties that are related to research. More specifically, the legal team advises on research consortia (agreements between research institutions and sometimes companies) that perform collaborative research projects, such as the subsidized EU Horizon-2020 projects, collaborations that are subsidized by ZonMW or projects that result from international collaborations without any specific external financing. Apart from providing legal documents and advice for the required agreements, TTO legal counsels assist in setting up a structure for such collaborations.

“TTO helped me out with the legislation and negotiation with a software company. That gave me the opportunity to focus on the substantive part of the agreement.”

Dr. R.J.M. van den Biggelaar – Intensive Care
Figure 3: The blue bar indicates the number of agreements reviewed by TTO’s Legal Team in 2016 per Theme. The red squares indicate the total number of FTE per Theme, and the green bar indicates the number of agreements that one would expect relative to the number of FTE per Theme.

Compared to 2015, the numbers do not differ that much. Theme “Biomedische Wetenschappen” had a considerable amount of agreements reviewed in 2016 compared to its size, and to a lesser extent also Theme “Diagnostiek & Advies” and Theme “Dijkzigt”.

2.3.2 Protection of interests and avoidance of risk

The TTO legal team focuses on protecting the interests of Erasmus MC, the scientific freedom (independence) of its scientists and minimizing its risks. In all cases, TTO aims at providing structure and arrangements that take into account the interests of all parties involved. This is essential, because we deal with ongoing collaborations while Erasmus MC researchers have to maintain an international network with other research institutions and industrial partners. The freedom to publish the scientific results is non-negotiable as we advocate that our staff should be free to publish. Timely publication without influence from commercial parties should always be possible; TTO legal facilitates such freedom and at the same time, grants our partners the possibility to review the proposed publications and discuss them with the scientists involved.
2.3.3 Intellectual property and scientific freedom

All research collaborations have an IP component due to the results generated during the research efforts. All TTO legal counsels are specialized in, inter alia, international IP legislation. Together with the research staff involved, they discuss suitable arrangements to protect the IP of both existing knowledge (background) of Erasmus MC and the new results of the project (foreground). Furthermore, the legal counsels make sure that (commercial) research partners have access to the results of the collaborative research, after payment of a reasonable compensation, if applicable, depending on both the scientific and financial contribution of all parties. At the same time, it is important to protect the possibility for Erasmus MC researchers to collaborate with all kinds of partners, including possible competitors of the current research partners.

Together with the business development managers, TTO legal counsels also provide advice in negotiating, drafting and reviewing “deal making” related agreements for the commercialization of Erasmus MC intellectual property. It is our policy to grant licenses (rights to use) rather than assigning/transferring rights regarding Erasmus MC intellectual property to commercial parties. In this way, we avoid that the industry might “shelve” the inventions, ensuring that we make all improvements available to society (patients) as soon as possible.

2.3.4 Steady growth of the work flow

Requests received for obtaining advice regarding agreements show a steady growth. The overview in Table 3 is limited to the drafting of agreements only, whereas the tasks of the legal counsel include counselling on various other matters as well.
Table 3: Production of TTO Legal team

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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Clinical Trial Agreements</td>
<td>132</td>
<td>184</td>
<td>214</td>
<td>16%</td>
</tr>
<tr>
<td>Material Transfer Agreements</td>
<td>79</td>
<td>107</td>
<td>198</td>
<td>85%</td>
</tr>
<tr>
<td>Confidentiality Agreements</td>
<td>82</td>
<td>117</td>
<td>141</td>
<td>21%</td>
</tr>
<tr>
<td>Grant/Consortium Agreements</td>
<td>106</td>
<td>122</td>
<td>95</td>
<td>-22%</td>
</tr>
<tr>
<td>Research Agreements</td>
<td>69</td>
<td>82</td>
<td>130</td>
<td>59%</td>
</tr>
<tr>
<td>- Inter-institutional</td>
<td>-</td>
<td>-</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>- Commercial</td>
<td>-</td>
<td>-</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Consultancy Agreements</td>
<td>46</td>
<td>68</td>
<td>56</td>
<td>-18%</td>
</tr>
<tr>
<td>Data transfer /database/ processor’s agreements</td>
<td>-</td>
<td>-</td>
<td>32</td>
<td>N/A</td>
</tr>
<tr>
<td>Other agreements*</td>
<td>206</td>
<td>299</td>
<td>305</td>
<td>**</td>
</tr>
<tr>
<td>Total</td>
<td>720</td>
<td>979</td>
<td>1171</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 3 shows the overall results of the production of the legal team. The overall production grew with 20 percent but these numbers differ a bit for different subdivisions. There is no conclusive reason for these differences, but it could be due to the categorization that scientists request when uploading documents evaluation.

* “Other agreements” are for example letters of intent/commitment, service agreements, speaker agreements and amendments to existing contracts.

** Due to a further subdivision of the different type of contracts, we do not report the increase of “Other agreements”.

At the end of 2016, the legal staff of TTO consisted of 8.35 FTE from 6.1 FTE year end 2015. One of the legal counsels was partially (approximately 0.3 FTE) entrusted with the training of the new staff and the coordination of the work of the group. As a result of the numerous requests for advice, including a number of complicated and time consuming files, there are still (too long) waiting times for the handling of the requests for advice. The TTO legal counsels aim to have a maximum waiting period of 15 working days. Unfortunately, this objective is regularly exceeded due to the growing workflow.

It is still unclear what percentage of IP and research related contracts of Erasmus MC scientists are never reviewed by the TTO legal counsels. To combat this, we increase awareness by attending department meetings and contributing to internal courses (such as BROK).

TTO created a flexible workforce for its legal team to request for support when there are periods of high demand resulting in longer response times. The justification for this flexible workforce is linked to Horizon 2020 coordinator positions. The position of the coordinator for such projects requires a lot of extra attention from our legal counsels due to the, often time-consuming, negotiations with a number of international collaborators. As a consequence other requests are delayed resulting in prolonged response times. Unfortunately, in 2016, the growth in requests was so high, that we used the flexible workforce almost on a permanent basis.
2.4 Erasmus MC Holding

Erasmus MC Holding B.V. is fully owned by Erasmus MC and manages Erasmus MC’s participations in subsidiaries which are related to: knowledge commercialization, care and/or externally financed projects. The goal of Erasmus MC Holding B.V. is to create and support the set-up of Erasmus MC subsidiaries. This support consists of management, financial and fiscal advice, consultancy and access to specialized facilities. Erasmus MC Holding B.V. was founded on December 31st 2003 and ultimo 2016 holds, directly or indirectly, participations in 30 subsidiaries, of which 11 are minority participations (see Table 4).

Table 4: Overview of all participations of Erasmus MC Holding B.V. ultimo 2016.

<table>
<thead>
<tr>
<th>Participation</th>
<th>% Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Move Implants B.V.</td>
<td>5</td>
</tr>
<tr>
<td>abcdeSIM B.V.</td>
<td>41,9</td>
</tr>
<tr>
<td>AgenD B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Arcarios B.V.</td>
<td>1,09</td>
</tr>
<tr>
<td>Cavadis B.V.</td>
<td>1,52</td>
</tr>
<tr>
<td>Eurza Arbo B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Erasmus Biomedical Fund B.V.</td>
<td>32,62</td>
</tr>
<tr>
<td>Erasmus Pharma B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Erasmus MC Ameland B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Erasmus MC Diabetesstation B.V.</td>
<td>78,4</td>
</tr>
<tr>
<td>Erasmus MC Schiermonnikoog B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Erasmus Epidemiology Resources B.V.</td>
<td>100</td>
</tr>
<tr>
<td>HBM Holdings Ltd.</td>
<td>10,86</td>
</tr>
<tr>
<td>HollandPTC B.V.</td>
<td>33,33</td>
</tr>
<tr>
<td>Medical Oncology Research B.V.</td>
<td>100</td>
</tr>
<tr>
<td>MI&amp;EUR B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Nano4Therapy B.V.</td>
<td>64</td>
</tr>
<tr>
<td>Neurasmus B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Quantib B.V.</td>
<td>45</td>
</tr>
<tr>
<td>Regionale Ontwikkelingsmaatschappij InnovationQuarter B.V.</td>
<td>1,66</td>
</tr>
<tr>
<td>Sophia Research B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Swanbridge Capital B.V.</td>
<td>37,04</td>
</tr>
<tr>
<td>Thoraxcentrum Research B.V.</td>
<td>100</td>
</tr>
<tr>
<td>UNIIQ B.V.</td>
<td>0,96</td>
</tr>
<tr>
<td>ViroNovative B.V.</td>
<td>100</td>
</tr>
<tr>
<td>Erasmus MC Zorg Holding</td>
<td>100</td>
</tr>
<tr>
<td>Apotheek A15 Holding B.V.</td>
<td>50</td>
</tr>
<tr>
<td>CBT Rijnmond B.V.</td>
<td>50</td>
</tr>
<tr>
<td>Geboortecentrum Sophia Holding B.V.</td>
<td>50</td>
</tr>
<tr>
<td>Poliklinische Apotheek Erasmus MC B.V.</td>
<td>100</td>
</tr>
</tbody>
</table>
The tasks of Erasmus MC Holding B.V. comprise:

- Encouraging and advising on entrepreneurship within Erasmus MC (for Erasmus MC spin-offs in collaboration with TTO). This service includes the possibilities of financial participation.
- Facilitate and support on the set up of businesses.
- Risk management for Erasmus MC and support for governance structures on large commercial projects and collaborations (non-spin-offs).

Erasmus MC Holding’s primary focus during 2016 was:

- Improving the internal control processes.
- Finalizing the participation regulation.
- Embedding the new investment funds.
- Process the impact of the corporate income taxes on the participations of Erasmus MC Holding B.V.
2.5 Incubator

The majority of the Erasmus MC Incubator’s activities are related to supporting Erasmus MC’s start-up companies by offering affordable laboratory- and office space in our Incubator in the Rotterdam Science Tower (RST), yearly advisory subsidies, as well as access to the knowledge and expertise of TTO and Erasmus MC.

In 2016, the TTO Incubator team worked on a proposal to apply for the EFRO II subsidy, to support start-ups with the development of a viable business plan since it is evident that there is still a significant gap between a good idea and a good pitch for investors. The ‘Kansen voor West’ authorities support this initiative and our grant application. Before we are able to apply in March/ April 2017, we need to find a matching contribution.

As from 2012, the RST became a real hotspot in the region. National- and international delegations came to visit the still growing community in and around our Incubator and RST. The increase of visits to the RST is also reflected in the role TTO plays to position the Incubator in the Rotterdam health innovations field.

In 2016, we took the initiative, together with our partners in the RST, to create the Health Hub. The Health Hub houses start-up companies in the healthcare sector that need office space, but not laboratory space. The Municipality of Rotterdam supported this initiative by subsidizing the set-up of the Health Hub.

The Incubator currently houses three companies:

SkylineDx, a company dedicated to optimizing therapeutic decision making through the development of molecular diagnostic tests for blood cancers and thereby, improving the quality of life of blood cancer patients.

Quorics (formerly known as CardioGenX) is developing APprofiler and continues its business under SkylineDx. The teams have been partially integrated. Quorics still has two ongoing European collaboration projects.

RiverD International creates and brings innovative solutions for unmet diagnostic needs based on Raman spectroscopic analysis of cells and tissues to market. Their current product portfolio consists of instruments for in vivo skin analysis and for bacterial prototyping, fully optimized microscope objectives for Raman spectroscopy, and the High Performance Raman Module (for OEM-customers).
3. Financials

In 2016, TTO has provided Erasmus MC with a significant amount of added value. This includes licensing income and income generated through contract negotiations with industry partners on other matters. These additional services, introduced in 2015, have proven to be of significant value to the Erasmus MC research staff. Significant added value was created especially in the negotiation of Clinical Trial Agreements and the support provided to applying for Dutch TKI-grants (see chapter 4.4). TTO intends to expand on these services provided to the departments to further increase the revenue from external collaborations, especially to those departments that have previously benefitted from the TTO services and that are requesting additional support.

As expected, the total amount of licensing income has been more or less stable throughout the last three years. The majority of the license agreements that have been signed since 2014 are not yet generating significant income. This is not unusual for out-licensing in the Life Sciences field as the time to market for most of the products that are being developed in this field is quite long. We expect the revenue from current licenses to slightly increase in 2017. However, additional revenue is expected from the out-licensing of data and other research results.

Table 5: Overview of Financials

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Erasmus MC contribution to TTO</td>
<td>€710.349</td>
<td>€756.132</td>
<td>€876.600</td>
<td>16%</td>
</tr>
<tr>
<td>Royalty Income</td>
<td>€440.000</td>
<td>€507.865</td>
<td>€392.624</td>
<td>-23%</td>
</tr>
<tr>
<td>WBSO Income realized for Erasmus MC</td>
<td>€502.745</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Additional Added Value</td>
<td>-</td>
<td>€3.135.770</td>
<td>€11.515.425</td>
<td>267%</td>
</tr>
<tr>
<td>Total added value for Erasmus MC</td>
<td>€232.396</td>
<td>€2.887.503</td>
<td>€11.031.449</td>
<td>**</td>
</tr>
</tbody>
</table>

Table 4 shows the total overview of TTO’s financials in 2016.

“Additional Added Value” is the added value due to (re)negotiating of contracts or to better budgeting. By offering our economic and business techniques, TTO Business Development Managers are able to add value to previous versions of budgets. The difference between the original budget and the new budget is calculated as “Additional Added Value”. Although this Additional Added Value is generated in 2016, the actual income will only be realized in the years to come.

“Total added value for Erasmus MC” is calculated as “Licensing Income” + “Additional Added Value” - “Erasmus MC Contribution”.

** A comparison of these numbers does not make sense as different elements contributed to the overall numbers over the years.
4. **Synergies within TTO**

This chapter focuses on certain achievements, obtained by means of close collaborations between the different teams of TTO.

4.1 **Spin-offs**

**Medaned B.V.**

Prof. Kleinrensink and a TU Delft student, Stefan van der Heijden, invented a new method for teaching anatomy during the minor Health & Industrial design. It bridges the gap between 2D textbook knowledge and 3D haptic experience, by providing students with physical models of anatomical structures. Cognitive load on the students is regulated by offering a step-by-step building instruction of the anatomical structure, accompanied by relevant anatomical and pathological theory. To this end, Medaned was founded and has developed the Carpal Bones model. These small bones reside inside your wrist and are particularly difficult for students to master. With this product, students are able to interact on a haptic level with the structure. Aside from being an educational method, the model can be used as a puzzle to test one’s familiarity with the structure. Every Medaned product is accompanied by an instructional booklet written by Prof. Kleinrensink from Erasmus MC.

After conducting market research, preparing a financial forecast, analysing the scalability and opportunities, Medaned will further market, develop and commercialize the carpal bones, tarsal bones and shoulder joint models.

TTO provided Medaned a know-how and copyright license to commercialize this innovation. The only drawback we faced, was the fact that it is very difficult for a start-up to allocate a small amount of its funding to cover production, marketing and communication costs, to name a few. While for upscaling efforts, a lot of funding is typically available. This once again underlines the necessity to fill the gap between a good idea and a solid pitch document (See chapter 2.5).

"Together with TTO I arranged a license deal with a start-up company: ‘Medaned’. TTO has a team with legal and business development experts. If you have an idea for innovation or an invention, you should go to TTO as fast as possible. They can help you!"

Prof. dr. G.J. Kleinrensink – Neurosciences
4.2 Erasmus MC Patent Policy
On October 3rd 2016 the Executive Board of Erasmus MC adopted the document:

“Protection and Valorization of Intellectual Property of Erasmus MC, Erasmus MC Patents Fund, Erasmus MC License Fund”, in short the Patent Policy. The existing document was updated, clarified and at some points extended.

This policy document provides rules for the protection of Erasmus MC intellectual property, information regarding the commercialization efforts of new technology by TTO and the distribution of potential revenues, as well as the payment of the obligatory “inventors reward” to the staff that was involved in the development of the respective new technology as an inventor. Although the rules already applied to new developments, which are not patentable, this rule was never implemented. Therefore, this document provides a clear description and definition of how the “inventors reward” will apply to these inventions. It also provides transparency for all parties involved and clear regulations regarding the tasks and rights of Erasmus MC staff.

4.3 Stock Ownership
On October 3rd 2016 the Executive Board of Erasmus MC adopted the new version of the so called “Participation Rule”. The previous document was carefully reviewed and extended. The update contains a regulation regarding stock ownership of all Erasmus MC staff and consequences for the employment of staff members in the event of stock ownership in companies with activities parallel or related to the area of activity in Erasmus MC. The rules were drafted with a focus on transparency and avoidance of any conflict of interest, thus securing the scientific independence of all Erasmus MC employees.

The document also contains a new section regarding the Governance Structure that applies for spin-off companies and stock ownership. Said governance structure includes the tasks of Erasmus MC Holding B.V. and the Trust Office (Stichting Erasmus Administratiekantoor Personeels Participaties), in short StAK. New rules for the Board of Trustees of StAK were included in the document, aiming at a further professionalization and increased efficiency.

The rules regarding stock ownership by Erasmus MC employees refer to the Patent Policy (mentioned in the previous paragraph), the Financial Conflict of Interest Policy and the rules regarding external employment (Regeling Nevenwerkzaamheden) in the Collective Labour Agreement for University Medical Centers (CAO UMC).

The Financial Conflict of Interest Policy (FCOI) and Standard Operating Procedures was adopted by the Executive Board on June 1st 2015. The FCOI contains detailed guidelines for all Erasmus MC staff (and their relatives) regarding possible conflict of interest situations and how such situations should be dealt with.
4.4 TKI
TTO has successfully created a TKI foundation allowance of €760,620,- based on ongoing research agreements. This foundation, set up by the Ministry of Economic affairs and handled by Health-Holland, is an allowance that can be allocated for Erasmus MC projects. The foundation was generated by screening 198 contracts with industrial partners that yielded cash contributions in 2015. These contracts had to comply with IP, publication and collaborative aspects required by TKI rules.

In addition and independently to the foundation allowance, TTO has provided assistance in several successful project applications resulting in additional funding. TTO assisted by acting as a liaison with Health-Holland, provided support with the application process and arranged the contracts required for each specific project. TTO provided the ‘Letters of Intent’ required for the project application stage by the Industrial Partner to participate and contribute to each specific project. Furthermore, TTO supported the completion of the relevant Consortium Agreements to the funded projects and the Health-Holland grant agreement per project. This makes TKI a very successful allowance program.

The combination of foundation allowance and project allowance created with support from TTO, resulted in an extra budget of €1,321,438,- for research purposes.
5.  Outlook 2017

By the end of 2016, the need for a serious discussion to redefine and rephrase the Mission of TTO became apparent due to the continued growth and the increased workload. In November 2016, we organized a strategy meeting for the whole team to discuss our Mission Statement, starting with the question “What exactly should our TTO do? How to define and protect the boundaries of our duties?” This meeting was co-moderated by our PROGRESS-TT mentor, who helped us to get to a clear set of priorities.

In 2017, this will be a major strategic project, as a redefinition of TTO’s Mission needs to be aligned with a stable and acceptable level of service to Erasmus MC. Furthermore, it must be in line with the strategic view of the Board of Erasmus MC, and with a sustainable budget for TTO. To this end, a risk analysis will be made by the Risk Manager of Erasmus MC in order to find the weak links in the processes, not only for TTO, but for Erasmus MC as a whole.

The outcome of this assessment may realign some current tasks of TTO so that its involvement is more focused in strategic projects that impact Erasmus MC as a whole, rather than single researchers or inventors.

However, as 2016 saw a substantial increase in the KPIs of TTO, we estimate a further growth in KPIs in 2017, which will require TTO to add another one or two team members and to further professionalize the teams in order to create higher efficiency in the work processes.

Business Development

The aim of the business development team for 2017 will be to focus their attention on closing deals and to prevent the innovation process from getting caught up in academic ‘greenfielding’, a phenomenon that occurs when there is a lack of direction for the innovation or project.

With the two PoC-funds close to home, we will certainly try to interest them in our Erasmus MC’s innovations, leading to more spin-offs.

After the success of the first “Healthy Ideas, Healthy Returns” we will collaborate to organize a second edition in 2017.
Legal
We would expect the growth of last year to continue during 2017 and we will continue to very carefully monitor the KPIs in this sense to find the optimum number of legal staff in relation to the number of request for advice and assistance. To lower the administrative burden, we will implement a new software system for automatic project distribution, administration and generation of management information.

The legal team has started an In-house Academy for all legal personnel at Erasmus MC and Erasmus University. Experts in the field are invited to give lectures and teach our professionals to get updated on the newest insights in the legal field.

Incubator
Next to the continued attention on the spin-offs in the Incubator, we will also focus on the foundation and support of the Health Hub in 2017.

Holding
In 2017, the Erasmus MC Holding B.V. will pay attention to the following:

Improving the management by means of: Centralizing business control into one team for all participations, strengthening the collaboration within C&C, strengthening the collaboration with TTO and focusing on meetings with the treasury department regarding agreements pertaining to existing loans and capital contributions. Special attention will be paid to the possibilities of setting-up a cash pool to make optimal use of the available liquidities.

Implementation of the decision made in 2015 regarding the amendment of Erasmus MC Holding B.V.’s governance structure.

Assessing future endeavors of the departmental B.V.s and deciding, based on the results, whether to continue or to cease their activities, the latter of which will then be transferred to Erasmus MC.

Proof-of-Concept funds: Involvement in all prospective Erasmus MC ventures and participations and implementation of all the agreements with UNIIQ and Swanbridge Capital, including the elaboration and assessment of the initial financing proposals.
Personnel ultimo 2016

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**TTO Homepage**
https://intranet.erasmusmc.nl/tto

**Linkedin**
https://www.linkedin.com/company/technology-transfer-office-tto-%E2%80%93-erasmus-mc

**TTO animation video**
https://www.youtube.com/watch?v=FfInsxr0nWw