Automating Reports with R Markdown

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Après Midi October 07, 2020
Disclaimer

The views and opinions expressed in this presentation are solely my own and do not necessarily represent or reflect the views of Swiss Re.
What is R Markdown?

R Markdown (Rmd) is an authoring format that enables easy creation of dynamic documents, presentations, and reports from R.

It combines the core syntax of markdown (an easy to write plain text format) with embedded R code chunks that are run so their output can be included in the final document.

source:
https://rmarkdown.rstudio.com/
Reproducibility and Automation: Shifting Paradigms!

Reproducibility: R Markdown documents are fully reproducible i.e.: automatically regenerated whenever underlying R code or data changes*

Some Key Benefits of Reproducibility:

- Understand what was done months ago;
- Adjust the code or data, even early in the process and re-run all analysis;
- Share with others so they can further extend your research source: R Programming for research

Automating reports

- Reproducibility entails automation but the converse is not always true
- We will focus on automating tasks regardless if the reproducibility chain is broken or not;
- A practical example of a fictional Casualty Insurance Company will be presented as a demo

* [https://rmarkdown.rstudio.com/](https://rmarkdown.rstudio.com/)
Quarterly Report: Messy Workflow

https://rich-iannone.github.io/DiagrammeR/mov/DiagrammeR.mp4
Quarterly Report: Messy Workflow

https://rich-iannone.github.io/DiagrammeR/mov/DiagrammeR.mp4
Why not do that all in R?

https://r4ds.had.co.nz/
R Markdown file
Ready to knit?
The three components of an R Markdown file:
YAML header; Text & Code chunk

**YAML header** defines the structure of the file such as defining the output format e.g.: Word, PDF, HTML...

**Text** written in Markdown. Markdown is designed to be an easy-to-write formatting syntax.

**R code** either via code chunks surrounded by ```` or via inline code `age_of_insured`.
Hit the knit! To generate the report
Alternatively use the shortcut Ctrl+Shift+K
What is happening under hood?

When R Markdown renders the .Rmd file it sends it to knitr, which executes the code chunks and creates a new markdown (.md) file.

The markdown file is then processed by pandoc which is responsible for creating the finished format.

All this happens with a simple click of a button!
What about my Python/SQL/JavaScript skills?

R Markdown *code chunks* can execute code in many other languages besides R such as:

- Python

```{python}
x = 'hello, python world!'
print(x.split(' '))
```

- SQL
- Bash
- Repp
- Stan
- JavaScript
- CSS

To get the full list of supported engines; type in the console: `names(knitr::knit_engines$get())`

Aaron Berg:
Automating Reports
Remarkable Re (RR) Study Case
<table>
<thead>
<tr>
<th>POL_ID</th>
<th>POL_INCEP</th>
<th>UWY</th>
<th>Insured</th>
<th>LoB</th>
<th>Region</th>
<th>LE</th>
<th>Industry</th>
<th>UP</th>
<th>UAC</th>
<th>PL</th>
<th>CR</th>
<th>IBNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>POL_10</td>
<td>31.03.2013</td>
<td>2013</td>
<td>Ganso</td>
<td>General Liability</td>
<td>Connolly</td>
<td>Remarkable Solutions</td>
<td>Sports</td>
<td>1'065.71</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-368.23</td>
</tr>
<tr>
<td>POL_10</td>
<td>31.03.2014</td>
<td>2014</td>
<td>Ganso</td>
<td>General Liability</td>
<td>Connolly</td>
<td>Remarkable Solutions</td>
<td>Sports</td>
<td>12'668.68</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-864.68</td>
</tr>
<tr>
<td>POL_10</td>
<td>20.06.2013</td>
<td>2013</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>3'0940.19</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-446.77</td>
</tr>
<tr>
<td>POL_10</td>
<td>01.01.2014</td>
<td>2014</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>87947.79</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-1'287.13</td>
</tr>
<tr>
<td>POL_10</td>
<td>01.04.2015</td>
<td>2015</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>37'758.71</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-4981.57</td>
</tr>
<tr>
<td>POL_10</td>
<td>01.04.2016</td>
<td>2016</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>30'981.87</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-9'885.97</td>
</tr>
<tr>
<td>POL_10</td>
<td>01.04.2017</td>
<td>2017</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>30'981.87</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-9'885.97</td>
</tr>
<tr>
<td>POL_10</td>
<td>01.06.2018</td>
<td>2018</td>
<td>Virgil van Dijk</td>
<td>General Liability</td>
<td>Disneyland</td>
<td>Remarkable Solutions</td>
<td>Mining/Metals</td>
<td>23'549.89</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-11'165.90</td>
</tr>
</tbody>
</table>

**LE** | Legal entity i.e.: remarkable’s entity which underwrote the policy

**Industry** | Industry/Occupancy of the policy holder

**UP, UAC, IBNR** | Ultimate Premium, Ultimate and IBNR respectively as at the valuation date

**PL, CR** | Total (cumulative) Paid Losses and Outstanding Case Reserves as at the evaluation date. Comprises all claims under the policy

**POL_ID** | Policy ID a unique policy identifier

**POL_INCEP** | Policy inception date

**UWY** | Underwriting Year

**Insured** | Name of the policy holder/client (football players)

**LoB** | Line of business

**Region** | region/land of the policy holder
Claims data, Initial Expectation (T0) data and Meta data

Claims data

<table>
<thead>
<tr>
<th>CLAIM_ID</th>
<th>CLAIM_DESC</th>
<th>POL_ID</th>
<th>PL</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAIM_15</td>
<td>CLNAME1/165005CLNAME2&lt;NA-&gt;POL_10</td>
<td>-30012.36</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>CLAIM_16</td>
<td>CLNAME1/189601CLNAME3&lt;NA-&gt;POL_10</td>
<td>-41705.43</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>CLAIM_17</td>
<td>CLNAME1/ALLEGED NON CONFORM POL_10</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>CLAIM_18</td>
<td>CLNAME1/ALLEGED NEGLIGENCE A POL_10</td>
<td>0.00</td>
<td>-162380.60</td>
<td></td>
</tr>
</tbody>
</table>

Claim_ID A unique claim identifier
Claim_DESC Brief description of the claim (includes unpleasant redundant characters e.g.: ‘CLNAME1/’)
POL_ID Policy identifier that originated the loss
PL and CR same meaning as in the policy data but for that specific loss as at the evaluation date

T0 Initial Expectation data

<table>
<thead>
<tr>
<th>POL_ID</th>
<th>UP</th>
<th>UAC</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>POL_20</td>
<td>1239.73</td>
<td>-185.98</td>
<td>0.00</td>
</tr>
<tr>
<td>POL_21</td>
<td>783.84</td>
<td>-198.98</td>
<td>-331.46</td>
</tr>
<tr>
<td>POL_22</td>
<td>0.00</td>
<td>-196.47</td>
<td>0.00</td>
</tr>
</tbody>
</table>

POL_ID, UP and UAC same meaning as in the policy data set
UL stands for Ultimate Loss in this case is the Ultimate Expected Loss since the origin is the T0 data set

Meta data

<table>
<thead>
<tr>
<th>financial period</th>
<th>date</th>
<th>extraction date</th>
<th>extraction time</th>
</tr>
</thead>
<tbody>
<tr>
<td>cq</td>
<td>31/12/2019</td>
<td>23/01/2020</td>
<td>09:45:03</td>
</tr>
<tr>
<td>lq</td>
<td>30/09/2019</td>
<td>23/01/2020</td>
<td>09:55:03</td>
</tr>
</tbody>
</table>

cq current quarter
lq last quarter
What type of reports can be produced with this data set?
An Example of a report in Word

https://davidgohel.github.io/officer/
https://davidgohel.github.io/officedown/
https://davidgohel.github.io/flextable/
# Remarkable Re’s
## Overview as of Q4 2019

Claudio Rebelo  
October 04, 2020

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1 Introduction

Remarkable Re (RR) is a wholly fictional company part of the Remarkable Insurance Group (RIG) and it is one of the world’s leading providers of Casualty (re)insurance.

Headquartered in Zurich, Switzerland, it was founded in October 2020 for the purpose of the ‘Actuarial Data Science Après-Midi’ discussion.

The scope of this study is to provide a monthly helicopter overview of RR’s financial situation to its internal key stakeholders.

This report should be read in conjunction with the non-existing detailed document describing RIG’s Swiss Solvency Test (SST) and its internal model.

The current version is only a draft and is not suitable for any other purpose than the set out above.

This remarkable report should not be quoted or referred to any third parties other than FINMA’s and RR’s independent auditors.

All figures are in USD unless stated otherwise.

Data as of December 31, 2019 was extracted on 23/01/2020 at 09:45:03 while data as of September 30, 2019 was extracted on 23/01/2020 at 09:55:03.
Table 1: Quarterly Technical Result in USD millions

<table>
<thead>
<tr>
<th>Premium:</th>
<th>2019</th>
<th>2018 &amp; prior</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Premium</td>
<td>0.7</td>
<td>0.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Acquisition Costs</td>
<td>-0.1</td>
<td>0.0</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

| Net Premium       | 0.6  | 0.1          | 0.6   |

<table>
<thead>
<tr>
<th>Losses:</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid Losses</td>
<td>-0.3</td>
<td>-0.8</td>
<td>-1.0</td>
</tr>
<tr>
<td>Case Reserves</td>
<td>-1.0</td>
<td>1.5</td>
<td>0.5</td>
</tr>
<tr>
<td>IBNR</td>
<td>1.1</td>
<td>3.4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

| Ultimate Losses   |      | 4.2          | 4.0   |

| Technical Results | 0.4  | 4.2          | 4.7   |

i) Technical Results = Net Premium + Ultimate Loss

The book experienced a **positive technical result of 4.7m** for contract years 2012 to 2019.

The result is mainly driven by IBNR releases due to low loss emergence whereof the largest 10 loss movements are:
The average costed loss ratio is 67.7% compared to the current average reserved of 68.4%, a difference of only 0.7%, for contract years 2012 to 2019.
### By most profitable insured

<table>
<thead>
<tr>
<th>Insured</th>
<th>Region</th>
<th>Line of Business</th>
<th>Legal Entity</th>
<th>Industry</th>
<th>Underwriting Years</th>
<th>Written Premium</th>
<th>Technical Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arturo Vidal</td>
<td>Connyland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Fishery</td>
<td>12, 13, 14, 15, 16, 17, 18, 19</td>
<td>3'204'495</td>
<td>1'465'977</td>
</tr>
<tr>
<td>Thibaut Courtois</td>
<td>Connyland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Government Administration</td>
<td>14, 15, 16</td>
<td>1'915'298</td>
<td>1'227'676</td>
</tr>
<tr>
<td>Luka Modric</td>
<td>Disneyland</td>
<td>General Liability</td>
<td>RR International</td>
<td>Fishery</td>
<td>12, 13, 14, 15, 16, 17, 18</td>
<td>2'802'174</td>
<td>1'189'076</td>
</tr>
<tr>
<td>Sergio Busquets</td>
<td>Legoland</td>
<td>General Liability</td>
<td>RR International</td>
<td>Sports</td>
<td>12, 13, 14, 15, 16, 17, 18, 19</td>
<td>1'677'351</td>
<td>1'146'233</td>
</tr>
<tr>
<td>Alexis Sánchez</td>
<td>Connyland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Banking/Mortgage</td>
<td>13, 14, 15, 16, 17, 18, 19</td>
<td>1'885'000</td>
<td>1'001'215</td>
</tr>
</tbody>
</table>

### By least profitable insured

<table>
<thead>
<tr>
<th>Insured</th>
<th>Region</th>
<th>Line of Business</th>
<th>Legal Entity</th>
<th>Industry</th>
<th>Underwriting Years</th>
<th>Claim Ratio</th>
<th>Written Premium</th>
<th>Technical Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jérôme Boateng</td>
<td>Neverland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Sports</td>
<td>17, 18, 19</td>
<td>8/6</td>
<td>1'655'850</td>
<td>-5'728'808</td>
</tr>
<tr>
<td>Paul Pogba</td>
<td>Cigoland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Automotive</td>
<td>17, 18, 19</td>
<td>2/3</td>
<td>1'117'721</td>
<td>-1'518'722</td>
</tr>
<tr>
<td>Claudio Marchisio</td>
<td>Connyland</td>
<td>General Liability</td>
<td>Remarkable Solutions</td>
<td>Entertainment/Movie Production</td>
<td>16, 17, 18, 19</td>
<td>1/4</td>
<td>398'498</td>
<td>-1'176'192</td>
</tr>
<tr>
<td>Toni Kroos</td>
<td>Disneyland</td>
<td>General Liability</td>
<td>RR International</td>
<td>Computer Software/Engineering</td>
<td>17</td>
<td>8/1</td>
<td>332'972</td>
<td>-1'163'318</td>
</tr>
<tr>
<td>Carlos Idriss</td>
<td>Disneyland</td>
<td>General Liability</td>
<td>RR International</td>
<td>Computer Software/Engineering</td>
<td>17, 18</td>
<td>1/2</td>
<td>42'259</td>
<td>-896'395</td>
</tr>
</tbody>
</table>
Loss banding by Region

- Nothing Reported
- 0 - 50k
- 50k - 250k
- 250k - 500k
- 500k - 2m
- 2m - 5m

Sites: Disneyland, Connyland, Cigoland, Legoland, Lapland, Neverland
Focus only on the non-automated sections

While it breaks the chain of reproducibility, the process is by far superior than the messy workflow

6 Changes in Actuarial assumptions

6.1 Apriori Loss Ratio adjustments

Challenge:
What can be done to (partially) automate this section?
HTML is the richest format for communication that supports a variety features
Example of a report in html
Remarkable Re’s Overview as of Q4 2019

Claudio Rebelo

October 05, 2020

1 Introduction

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Data as of December 31, 2019 was extracted on 23/01/2020 at 09:45:03 while data as of September 30, 2019 was extracted on 23/01/2020 at 09:55:03.
Description of main quarterly loss movements

Underwriting year 2019:

- USD -0.92m new loss on Dejan Lovren (Region: Disneyland, Industry: Computer Software/Engineering, Entity: Remarkable Solutions)
- USD -0.17m new loss on Cristiano Ronaldo (Region: Connyland, Industry: Package/Freight Delivery, Entity: Remarkable Solutions)
- USD +0.13m loss improvement on Stefan Savic (total to date: 0.00m, Region: Disneyland, Industry: Law Practice/Law Firms, Entity: Remarkable Solutions)

Underwriting year 2018:

- USD +0.60m loss improvement on Claudio Marchisio (total to date: -1.30m, Region: Connyland, Industry: Entertainment/Movie Production, Entity: Remarkable Solutions)
- USD -0.56m loss worsening on Carlos Idriss Kameni (total to date: -0.92m, Region: Disneyland, Industry: Computer Software/Engineering, Entity: Remarkable Solutions)
- USD +0.56m loss improvement on Manuel Neuer (total to date: -0.02m, Region: Cigoland, Industry: Banking/Mortgage, Entity: Remarkable Solutions)
- USD -0.13m loss worsening on Marcelo (total to date: -0.18m, Region: Disneyland, Industry: Sports, Entity: Remarkable Solutions)
- USD -0.11m loss worsening on Bernd Leno (total to date: -0.22m, Region: Cigoland, Industry: Automotive, Entity: Remarkable Solutions)
- USD -0.11m loss worsening on Robert Lewandowski (total to date: -0.40m, Region: Disneyland, Industry: Law Practice/Law Firms, Entity: Remarkable Solutions)

Underwriting year 2015:

- USD +0.64m loss improvement on Thibaut Courtois (total to date: 0.00m, Region: Connyland, Industry: Government Administration, Entity: Remarkable Solutions)
### Table 2.2: Quarterly Technical Result in USD millions

<table>
<thead>
<tr>
<th>UW Year</th>
<th>Premium</th>
<th>Acquisition Costs</th>
<th>Reported Losses</th>
<th>IBNR</th>
<th>Ultimate Loss</th>
<th>Technical Result</th>
<th>Ultimate Loss Ratio</th>
<th>Combined Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>3.7</td>
<td>-0.2</td>
<td>0.0</td>
<td>-0.4</td>
<td>-0.4</td>
<td>3.0</td>
<td>11%</td>
<td>17%</td>
</tr>
<tr>
<td>2013</td>
<td>5.3</td>
<td>-0.4</td>
<td>0.0</td>
<td>-0.7</td>
<td>-0.7</td>
<td>4.2</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>2014</td>
<td>9.4</td>
<td>-0.6</td>
<td>-0.3</td>
<td>-2.2</td>
<td>-2.5</td>
<td>6.3</td>
<td>26%</td>
<td>33%</td>
</tr>
<tr>
<td>2015</td>
<td>9.8</td>
<td>-1.0</td>
<td>-0.5</td>
<td>-2.8</td>
<td>-3.3</td>
<td>5.5</td>
<td>34%</td>
<td>44%</td>
</tr>
<tr>
<td>2016</td>
<td>11.6</td>
<td>-1.4</td>
<td>-1.4</td>
<td>-4.7</td>
<td>-6.0</td>
<td>4.1</td>
<td>52%</td>
<td>64%</td>
</tr>
<tr>
<td>2017</td>
<td>15.3</td>
<td>-2.4</td>
<td>-6.6</td>
<td>-6.6</td>
<td>-13.1</td>
<td>-0.1</td>
<td>86%</td>
<td>101%</td>
</tr>
<tr>
<td>2018</td>
<td>23.0</td>
<td>-3.7</td>
<td>-15.4</td>
<td>-10.6</td>
<td>-26.1</td>
<td>-6.7</td>
<td>113%</td>
<td>129%</td>
</tr>
<tr>
<td>2019</td>
<td>34.9</td>
<td>-5.4</td>
<td>-4.4</td>
<td>-20.9</td>
<td>-25.2</td>
<td>4.2</td>
<td>72%</td>
<td>88%</td>
</tr>
<tr>
<td>Total</td>
<td>112.9</td>
<td>-15.2</td>
<td>-28.5</td>
<td>-48.7</td>
<td>-77.3</td>
<td>20.5</td>
<td>68%</td>
<td>82%</td>
</tr>
</tbody>
</table>

The combined loss ratio is

82%

for contract years 2012 to 2019.

The average loss ratio is 68% for the same period while the worst performing year is 2018 with a combined loss ratio of 129%.
Figure 5.1: Reported Losses as at prior and current quarter.
With R you can build web applications with Shiny

Thus, the question to be asked is:

Can we incorporate Shiny in an R Markdown html document?
Mark meets Shiny
Add in the YAML section

```yaml
runtime: shiny
```

3.1 Quarterly movement by Paid Losses
Note that:

When you add a shiny component to your R Markdown document, the file can no longer be saved locally neither can it be shared as a stand-alone file.

Interactive documents require a server side.

You can share the file like any other shiny app.
My two cents about adding Shiny to an R Markdown report

Keep Shiny components fairly simple

A report is like a story: you – as the writer – should be in control of the narrative

Too many Shiny components is likely to distract the reader from the message you are trying to convey: it should still be a report and not a dashboard

As a suggestion: add a Shiny component (e.g.: dashboard) in the appendix
Parameterized reports
The road to full Automation
Reach the next level of automation with parameterized reports

Add **params** to the YAML header (line 16)

Adjust your code

replace the variable with `params$region`

**Before:**

```r
filter(df_RR, Region == "Cigoland")
```

**After:**

```r
filter(df_RR, Region == params$region)
```
Knit with Parameters

Knit with Parameters

The document is now a regional Cigoland report

2 Cigoland’s Technical Results

2.1 Quarterly results

The table below displays the quarterly technical result as of December 31, 2019. Note that all values are according to their financial impact for example, negative losses represent an increase in loss amount.

<table>
<thead>
<tr>
<th>Underwriting Year</th>
<th>USD thousands</th>
<th>2019</th>
<th>2018 &amp; prior</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Written Premium</td>
<td>11k</td>
<td>0k</td>
<td>11k</td>
<td></td>
</tr>
<tr>
<td>- Acquisition Costs</td>
<td>0k</td>
<td>0k</td>
<td>0k</td>
<td></td>
</tr>
<tr>
<td>Net Premium</td>
<td>11k</td>
<td>0k</td>
<td>11k</td>
<td></td>
</tr>
<tr>
<td>Losses:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Paid Losses</td>
<td>-1k</td>
<td>-602k</td>
<td>40-1k</td>
<td></td>
</tr>
<tr>
<td>- Case Reserves</td>
<td>10k</td>
<td>941k</td>
<td>95k</td>
<td></td>
</tr>
<tr>
<td>- IBNR</td>
<td>-10k</td>
<td>343k</td>
<td>333k</td>
<td></td>
</tr>
<tr>
<td>Ultimate Losses</td>
<td>-1k</td>
<td>682k</td>
<td>681k</td>
<td></td>
</tr>
<tr>
<td>Technical Results</td>
<td>10k</td>
<td>682k</td>
<td>691k</td>
<td></td>
</tr>
</tbody>
</table>

The book of business experienced a positive result of 691k for contract years 2012 to 2019. The result is mainly driven by improvement in Reported Losses and by IBNR releases.

Underwriting year 2019:
- USD +11k loss improvement on Paul Pogba (total to date: 0k, Region: Cigoland, Industry: Automotive, Entity: Remarkable Solutions)
Can we automate the workflow even further?
Can we automate the workflow even further?

**YES!**

Use the `params` argument in the `render` function to pass the parameters as a list.

Next step: create a function inside a `for loop` to run as many reports as needed in one go!
Follow the BBC approach

Develop dedicated corporate packages for:

- Corporate Branding
- Data Extraction
- Visualizations
- ...

To facilitate the implementation of the “R Markdown” workflow

https://bbc.github.io/rcookbook/

With RStudio Connect

RStudio Connect is a paid publishing platform

Each parameterized report can be saved on the platform.

You can add a mailing list to each saved report and instruct RStudio Connect to run and email the reports according to a predefined schedule!

That is full automation!

Faster & Better

From the Messy Workflow to the R Markdown approach we created reports:

- Much faster
- With less resources
- and more importantly, delivered a much better final product!
If cars can drive themselves, so can your reports

Claudio Rebelo, Actuary, Swiss Re.
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