

IQReport: A Software Solution for Enhanced Report Generation Ensuring Workflow Efficiency, Traceability, and Reproducibility

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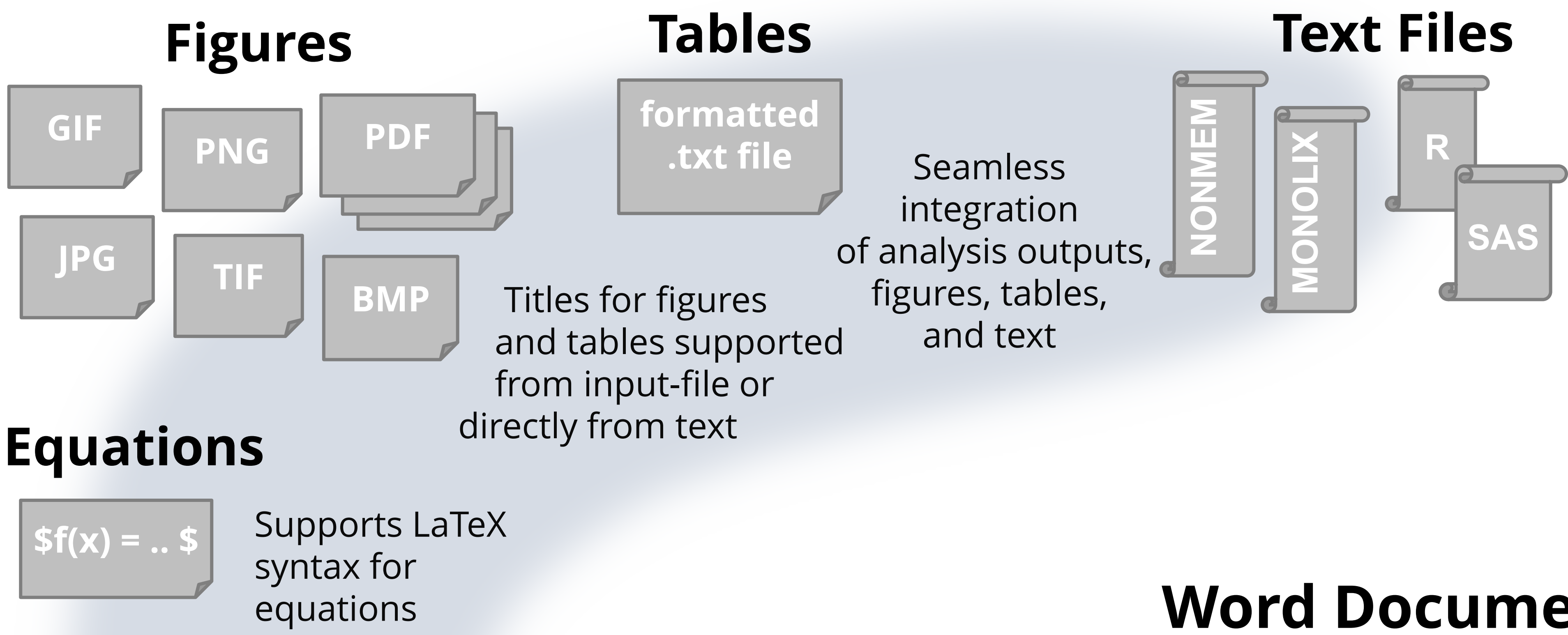
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IQReport enhances workflow efficiency, traceability, reproducibility, and report organization even for complex pharmacometric analyses. The IQReport language is based on user-friendly extended Markdown syntax for integration of common analysis outputs in a script-based manner for hassle-free report generation. Relying on readily-available open-source 3rd party software, it outputs customizable and fully-editable Microsoft Word documents that can be shared within organisations or with agencies.

Why We Use IQReport:

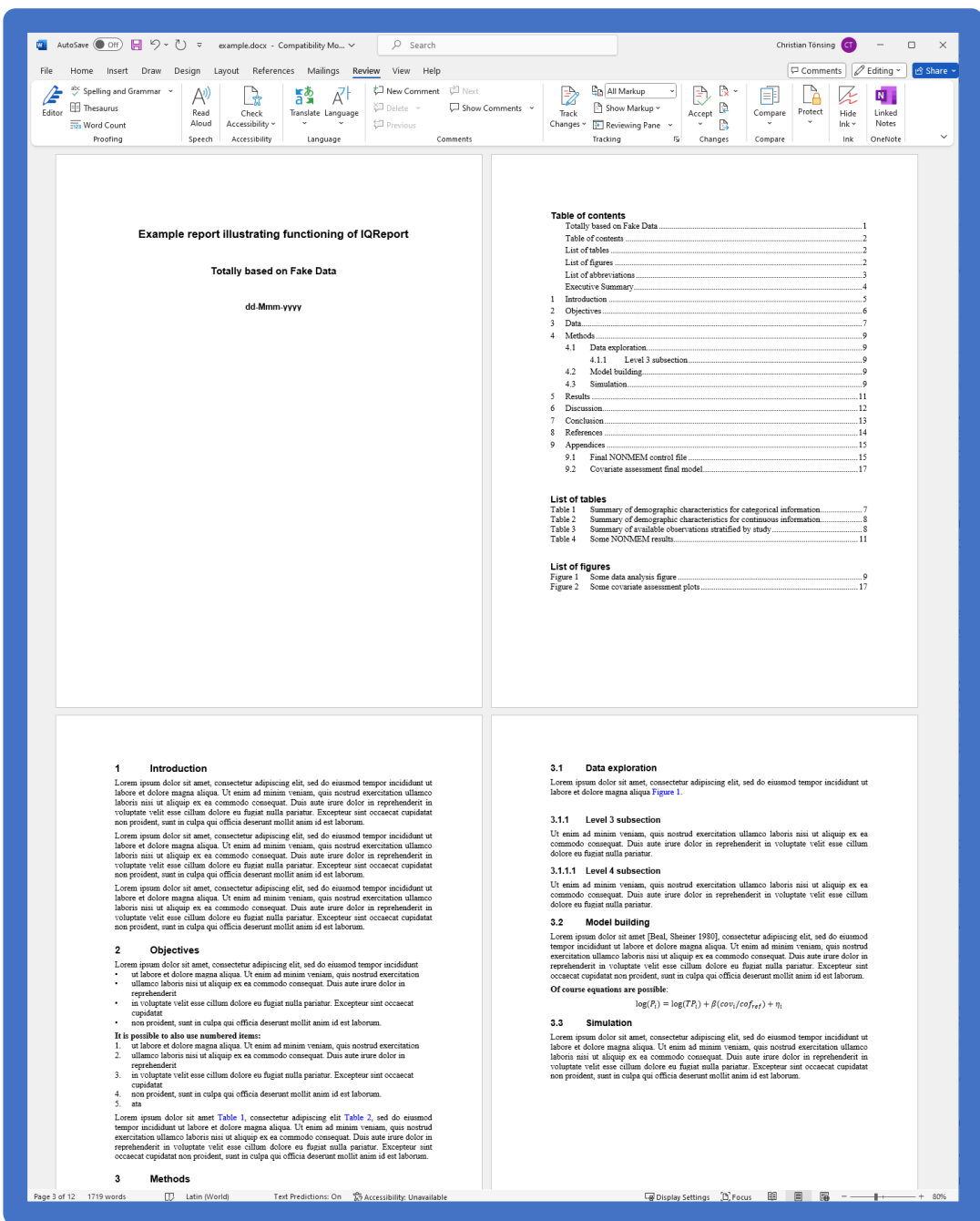
- Script-based reporting allows direct inclusion of analysis outputs
- The software supports full traceability and reproducibility of the analysis
- The output is a well formatted Microsoft Word document with key structural elements, fully suited for reports aimed at regulatory interactions



IQReport Document



- User friendly syntax
- Easy integration into popular coding environments
- Allows painless updating
- Outputs editable Word reports
- Word style template for compatibility with desired corporate format
- Facilitates tracked editing of the report as Word document



Ensures reproducibility

Mitigates copy & paste mistakes



Automated cross-referencing, including hyperlinks

Precise figure placement

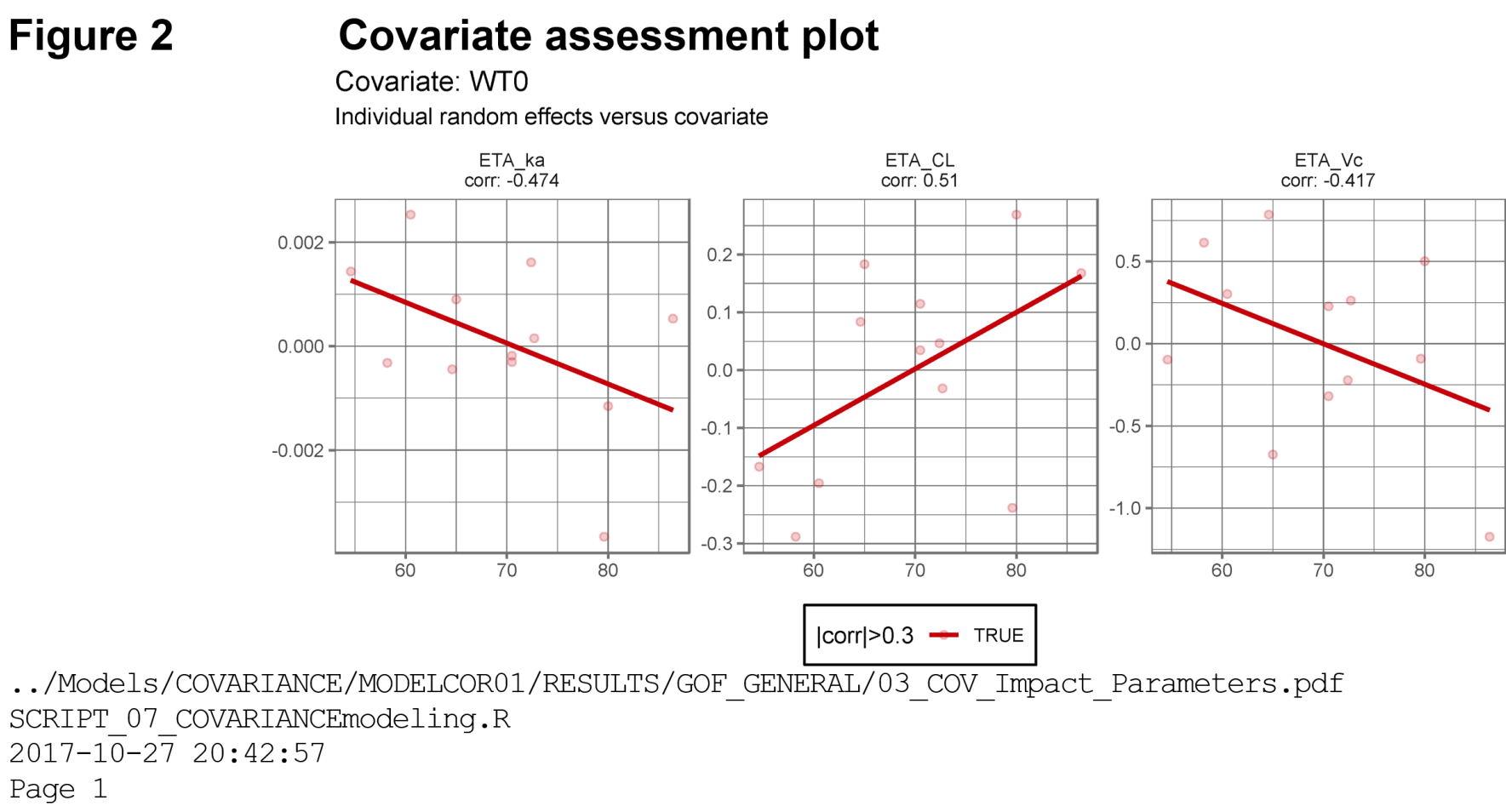
IQReport is not limited to Pharmacometrics, but can be used for regulatory reports, memos, result summaries, internal communication, and personal note-taking.

Figures, Cross-Referencing, and Traceability

In @FIG(FIG_COV_WT0), a covariate assessment plot is shown.

```
!FIG[Covariate assessment plot, label:FIG_COV_WT0, crop:true, scale:70]
(material/03_COV_Impact_Parameters.pdf)
```

In Figure 2, a covariate assessment plot is shown.



Automatic Timestamp and Source Documentation

```
File generation log
-----
<TT> File (relative to calling function)  ../Models/COVARIANCE/ModelCOR01/RESULTS/03_COV_Impact_Parameters.pdf
<TR> Username                            henning
<TR> Date of creation                     2017-10-27 20:42:57
<TR> Analysis file                       SCRIPT_07_COVARIANCEModeling.R
```

- Ensuring effortless traceability
- For all included figures, tables, etc.
- Reads information from script-generated log files

Integration of Figures

- From PDF (Selection of pages in a multi-page PDF), PNG, JPG, GIF, BMP and TIF
- Automatic cropping of white space supported
- Relative size can be altered with scale command

Cross Referencing

- Can be used for tables, figures, sections, and even for elements in tables.

Mathematical Expressions

```
$$\log(P_i) = \log(TP_i) + \log(\beta(cov_i/cof_{ref})) + \eta_i$$
```

$$\log(P_i) = \log(TP_i) + \beta(cov_i/cof_{ref}) + \eta_i$$

Mathematical Equations

- LaTeX syntax supported
- Rendered as fully editable Word equation
- Inline or “stand-alone” equations

Page Layout and Tables

```
!LANDSCAPE
!TAB[size:8, label:TAB02](material/TAB01_demographics_COV.txt)
!PORTRAIT
```

Table 3 Summary of available observations stratified by study									
Data	N Subjects	N samples	N BLQ samples*	N BLQ samples post first dose*	N missing observations	N missing time information	N non-zero pre-first dose samples**	N other outliers	N samples included in analysis
ABCD1	50	1104	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	14 (0.321%)	1450 (94.7%)
ABCD2	100	1369	72 (5.26%)	72 (5.26%)	0 (0%)	0 (0%)	0 (0%)	1297 (94.7%)	1297 (94.7%)
ABCD3	200	1648	1 (0.0607%)	1 (0.0607%)	8 (0.485%)	0 (0%)	0 (0%)	1639 (99.5%)	1639 (99.5%)
TOTAL	350	4521	73 (1.61%)	73 (1.61%)	8 (0.177%)	0 (0%)	0 (0%)	14 (0.31%)	4426 (97.9%)

Integration of Tables

- Inline tables in IQReport document or integration from formatted .txt files
- Direct integration of NONMEM results (via R API)
- Tables are well formatted and editable in Word

Page Orientation

- Landscape page layout allows dealing with wide tables or figures on selected pages

Technical Details

IQReport relies on readily-available open-source 3rd party software, that is for example pre-installed on any Ubuntu installation.

Required third party software:

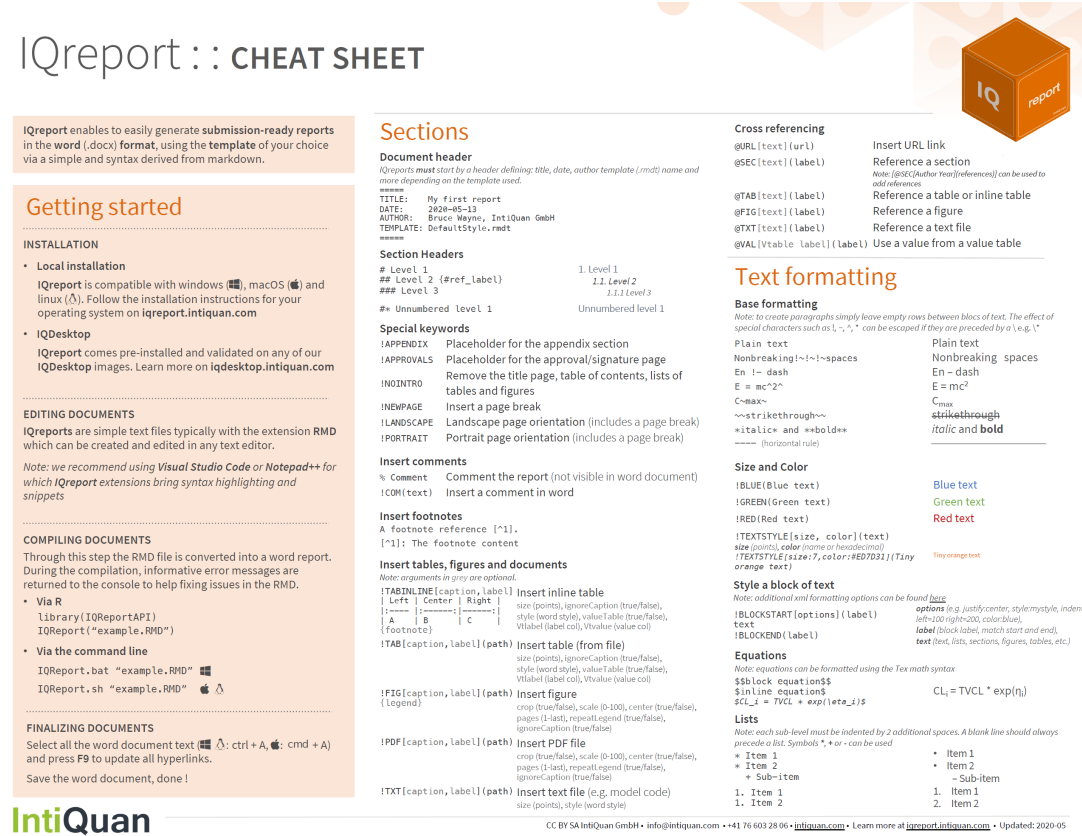
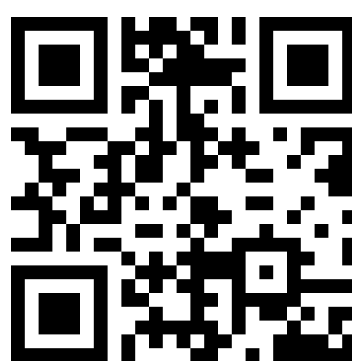
- Pandoc^[1]: used for the basic conversion into a Word document.
- Ghostscript^[2]: handling of PDF inputs, allowing conversion to PNG or single page extraction.
- ImageMagick^[3]: utilized to crop white space around figures.

IQReport Language Support

The IQReport language comes with extensive supporting material:

- Running example
- Cheat sheet with key features of the language
- Add-ons for VSCode and NotePad++

Available on: <https://iqreport.intiquan.com/doc/book/> →



References: [1]: www.pandoc.org [2]: www.ghostscript.com [3]: www.imagemagick.org

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Declaration of interests: Authors Miriam Stuke and Dr. Christian Tönsing are employees of IntiQuan AG. Dr. Henning Schmidt is the CSO of IntiQuan AG.

