HOW NATURAL LANGUAGE PROCESSING (NLP) IS TRANSFORMING FINANCE

DR. ISABELLE FLÜCKIGER
SWISSQUOTE CONFERENCE
09 NOV 2018
WHAT IS CHANGING IN FINANCE
TECHNOLOGY IMPACT ON FINANCE

Today

PLAN
- Strategic planning
- Target setting
- Financial planning
- Forecasting
- Tax/treasury planning

TRANSACT
- Supplier payments
- Employee payments
- Customer receipts
- Cash management

ACCOUNT
- Transaction accounting
- Asset accounting
- Tax accounting

CONTROL
- Accounting close/consolidation
- Account reconciliation
- Error processing
- Internal audit

COMPLY
- Statutory reporting
- Tax filing
- Statutory compliance
- Policy compliance
- Regulatory compliance

REPORT
- Enterprise performance reporting
- Financial reporting
- Management reporting

ANALYZE
- Portfolio analysis
- Performance analysis
- Investment analysis

ADVISE
- Business advisor
- Strategy execution support
- M&A Support
- Board of Directors engagement

Tomorrow

PLAN

TRANSACT

ACCOUNT

CONTROL

COMPLY

REPORT

ANALYZE

ADVISE

Focus of professional staff time

Largely digitized (>80%)
EXAMPLE: CONTROLLER WILL BECOME DATA MODEL AND MACHINE LEARNING EXPERTS

Illustrative: Typical tasks & time distribution of Controllers
**HUMAN + MACHINES COMPLEMENT EACH OTHER**

**IMPORTANT: ACTIVITIES ARE BEING REPLACED NOT JOBS PER SE**

<table>
<thead>
<tr>
<th>Lead</th>
<th>Empathize</th>
<th>Create</th>
<th>Judge</th>
<th>Train</th>
<th>Explain</th>
<th>Sustain</th>
<th>Amplify</th>
<th>Interact</th>
<th>Embody</th>
<th>Transact</th>
<th>Iterate</th>
<th>Predict</th>
<th>Adapt</th>
</tr>
</thead>
</table>

- **Human-only activity**
- **Human and machine hybrid activities**
- **AI gives humans superpowers**

**H**

**M**

**Human-only activity**

**Machine-only activity**
## How a Future Workforce Could Look Like

<table>
<thead>
<tr>
<th>Role</th>
<th>Up To:</th>
<th>Technology (AI/RoBots)</th>
<th>Human</th>
<th>Future Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountants</td>
<td>80%</td>
<td></td>
<td>20%</td>
<td>RPA Managers</td>
</tr>
<tr>
<td>Budget Analysts</td>
<td>80%</td>
<td></td>
<td>20%</td>
<td>Scenario Modelers</td>
</tr>
<tr>
<td>Financial Analysts</td>
<td>30%</td>
<td></td>
<td>70%</td>
<td>Data Scientists</td>
</tr>
<tr>
<td>Tax Examiners &amp; Preparers</td>
<td>60%</td>
<td></td>
<td>40%</td>
<td>Advanced Analytics</td>
</tr>
<tr>
<td>Auditors</td>
<td>80%</td>
<td></td>
<td>20%</td>
<td>Exception Handlers</td>
</tr>
<tr>
<td>Treasurers</td>
<td>40%</td>
<td></td>
<td>60%</td>
<td>Cash Flow Optimizers</td>
</tr>
</tbody>
</table>

*Copyright © Accenture 2018. All rights reserved.*
Fact: Finance in practice are not only numbers, algorithms and models but an immense amount of administration, documents, reports, information gathering, …
MARKET EXAMPLES
EXAMPLE: (E)-MAIL RESPONSE AUTOMATION
COMPANIES ARE SUFFERING FROM A WASTE AMOUNT OF E-MAILS FROM CUSTOMERS, COMPLIANCE REQUESTS, EMPLOYEES AND SO ON

SOLUTION DEVELOPMENT

ENTITY/FEATURE EXTRACTION FROM EMAILS

Apply entity extraction to email/ticket content to identify key information. e.g. product, serial number

CLASSIFICATION ACCORDING TO DAIMLER CATEGORIES

Based on the identified contents classify emails according to Daimler categories

FILLING EXTRACTED INFORMATION INTO THE RIGHT TEMPLATE (IF APPLICABLE) TO GENERATE A RESPONSE

Automatically generated structured template for follow-up processing through RPA

Email/Ticket

Hello,
I have a problem with the latest invoice for PO30087361. The invoice has been sent on 20.05.2018 and was supposed to be paid after 30 days. Can you call or email me? Phone: +49 711 540 8767.
Email: john.doe@email.com
Thanks!

CATEGORIES

① Invoice | Payment | Reminder
② Invoice | Status | Check
③ Invoice | Status | Dunning

① Apply entity extraction to email/ticket content to identify key information. e.g. product, serial number
② Based on the identified contents classify emails according to Daimler categories
③ Automatically generated structured template for follow-up processing through RPA
EXAMPLE: THE (TOO) MANY COMMUNICATION CHANNELS

SPEECH TO TEXT, TEXT TO SPEECH AND STRUCTURED DIALOGUES FOR SALES, CLAIMS, TRADING, RISK MANAGEMENT ETC.

Classification of the requests & AI/NLP based solving. Depending on the channel with today’s methods 30 – 70% can be automated.

Contact Center/CRM

Backend

Human agents

Chat Frontend

Voicebot

Chatbot

IVR

Digital Conversion Facility

Escalation and hand-back

Mid/Back Office

Chat

Call

Actions are either directly executed by the AI platform or created as ticket to be processed by RPA or other means e.g. trade bookings, compliance information.

NLP/AI Platform

Ticket / RPA

Flow Integration

Backends

Centralized AI logic and model for chatbot and voice bot

Copyright © Accenture 2018. All rights reserved.
EXAMPLE: SIGNALS IN THE MARKET
MINING AND INTERPRETATION OF SIGNALS IN THE MARKET LIKE SPEECHES OF THE FEDERAL RESERVE OFFICIALS

- Sentiment Analysis
- Consistency analysis
- Consistency analysis with former speeches
- Image analysis body language
- Conclusion about the future monetary politics
EXAMPLE: FIND THE RIGHT PERSON AND EXPERTISE
FINANCE FUNCTIONS REQUIRE MORE AND MORE SPECIAL SKILLS. LARGE
COMPANIES OFTEN SUFFER TO KNOW WHO IS THE RIGHT PERSON FOR A
CERTAIN INFORMATION OR TASK WITHIN AN ORGANISATION

① Understands skills
② Understands time, level, languages
③ Understands relative location
COMPANIES HAVE AN IMMENSE NUMBER OF CONTRACTS FOR TRADES.
HOW TO ACT ON EMBEDDED FINANCIAL AND REAL OPTIONS E.G. IN
CHANGING MARKET ENVIRONMENTS?

EXAMPLE: POST-TRADE

Identification Of Embedded Options

Main Pricing Terms
- Fixed / Indexation
- Other Pricing Options

Main Volumetric Terms
- Volume Commitment
- Tolerance and Take or Pay Penalties
- Embedded Call/Put Options
- Additional Volumetric Terms

Other Option Terms
- Volume Swing / Swap / Diversions
- Quality Specification
- Location / Incoterm Options
- Other Advanced Options

Settlements

Trade Settlement Requests

- Operation desk receives many post trade settlement requests via emails.
- The received emails are mostly written in English and contain important information like SSID etc.
- Emails can contain the information in the form of plain text or a PDF or an Excel sheet.

SME Pool

- Replace SME pool with an AI routing engine that will assign emails to particular Analyst

Analyst

- Read emails, identify request type, infer required data, take appropriate actions

NLP AI algorithms can review physical contract terms and identify embedded financial and / or real options.

Gloss

- Aid analysts with AI based adjudication application that will read the assigned emails, identify the actions and infer the required data using Natural Language Processing.

Copyright © Accenture 2018. All rights reserved.