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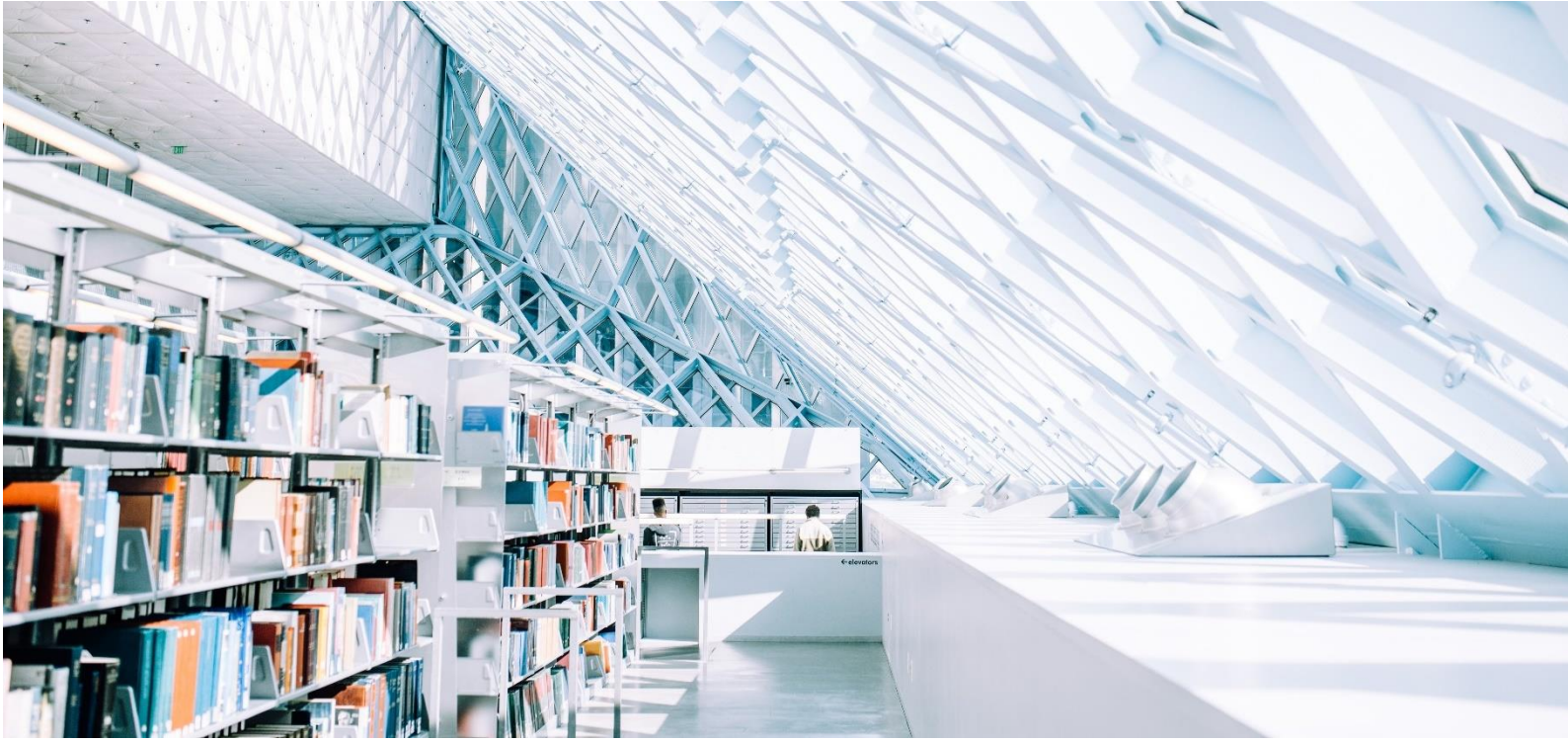
DIGITAL COMPANIES IN THE EUROPEAN RAIL SECTOR

PART ONE

Independent medium sized software companies

2022



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DIGITAL COMPANIES IN THE EUROPEAN RAIL SECTOR 2021
PART ONE: independent medium sized software companies

Cologne, January 2022

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Generally, the rail sector features longer product-life and development cycles than other industries. Initially, the adoption of new digital technologies therefore lagged behind with respect to other industries. Lately, the market for digital rail solutions has gained momentum and develops dynamically through the changes in three different fields: technological changes and enhancement, the emergence of new business concepts and initiating regulatory and institutional changes.

Changes in technologies

Within the first field, the introduction and enhancement of several new technical approaches such as artificial intelligence, cloud technology, big data science and their adaptations from other industries have paved the way for numerous new digital solutions in the rail sector. Other promising approaches e.g., block chain are currently still in its infancy in the rail industry, however, they are likely to play a vital role for instance in the establishment of multimodal transport systems and new business concepts for share economy in the rail sector. Moreover, the already mentioned technologies will further be deepened and improved for a wider exploitation of their potentials.

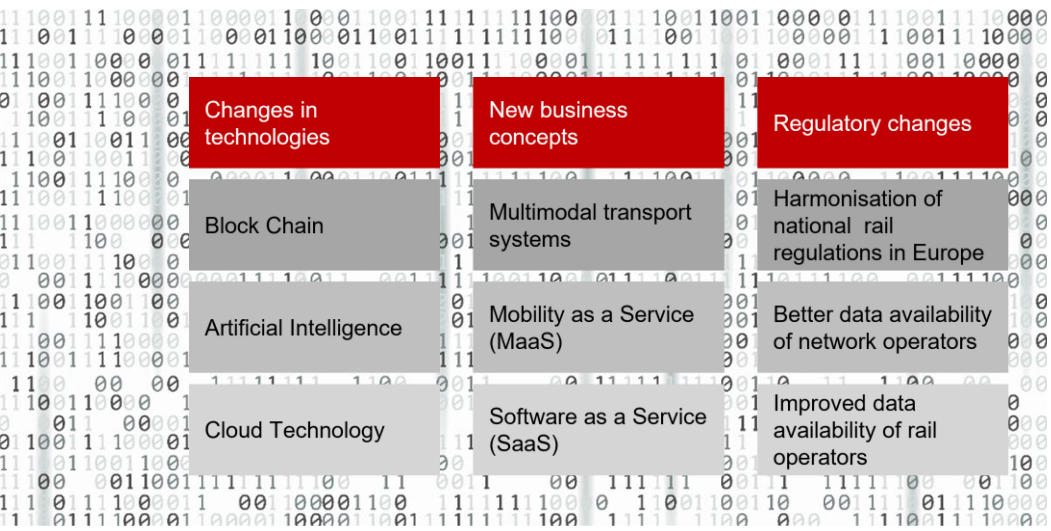


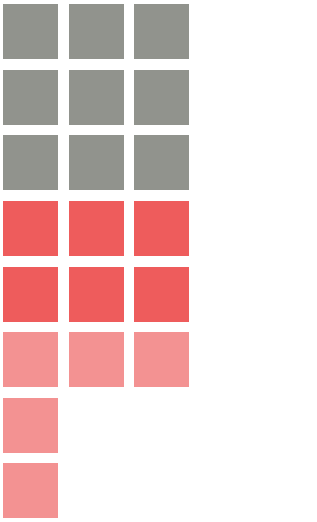
Figure 2: Drivers of the industry for digital solutions in the rail sector

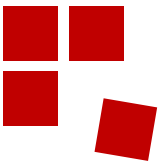
New business concepts

Concerning the second field, namely arising new business concepts, the previously named technologies such as cloud computing and an increased willingness to share data and resources enabled an entire new business field with the wide introduction of software as a service (SaaS) solutions. Also, the availability and processing of large volumes of data gave birth to other concepts such as Mobility as a Service (MaaS) solutions for passenger transportation. Not only in the field of passenger transport but also with respect to the freight transportation sector there is additional room for multimodal transport systems, that incorporate more providers and means of transportation and allow for a more transparent tracking, invoicing, and an increased efficiency. Furthermore, the relevance of sharing economy with respect to assets and resources in the rail sector will gain in relevance in the upcoming years.

Market consolidation and increasing number of start-ups concentrating on digital solutions:

The market for software solutions within the European rail sector has experienced a series of consolidation. In particular large players have acquired a variety of smaller software companies in the past. For example, in August 2021, Siemens Mobility has taken over the majority of Sqills for EUR 550 million. In May of 2021, Siemens Mobility has acquired Padam Mobility from France. The start-up is a French Software as a Service (SaaS) provider for on-demand and paratransit software solutions. With several other acquisitions in the previous years, Siemens Mobility has established an ecosystem of digital services and solutions branded as “Combined Power for Mobility” which also includes Hacon, Bytemark from the US and eos.uptrade. Similarly, Knorr Bremse holds several stakes of smaller software companies and start-ups. In 2019, Knorr Bremse acquired 32% of all shares from the Belgian start-up Railnova. In the same year, Knorr Bremse also acquired a share of 21.3% of Rail Vision that has been extended to 36.8% in the following year. In Great Britain, Tracsis has evolved as a key player in the development of technologies for resource monitoring and optimisation in the railway and transport industry. Over the past decade, Tracsis has acquired several smaller British start-ups, with iBlocks being the latest acquisition.





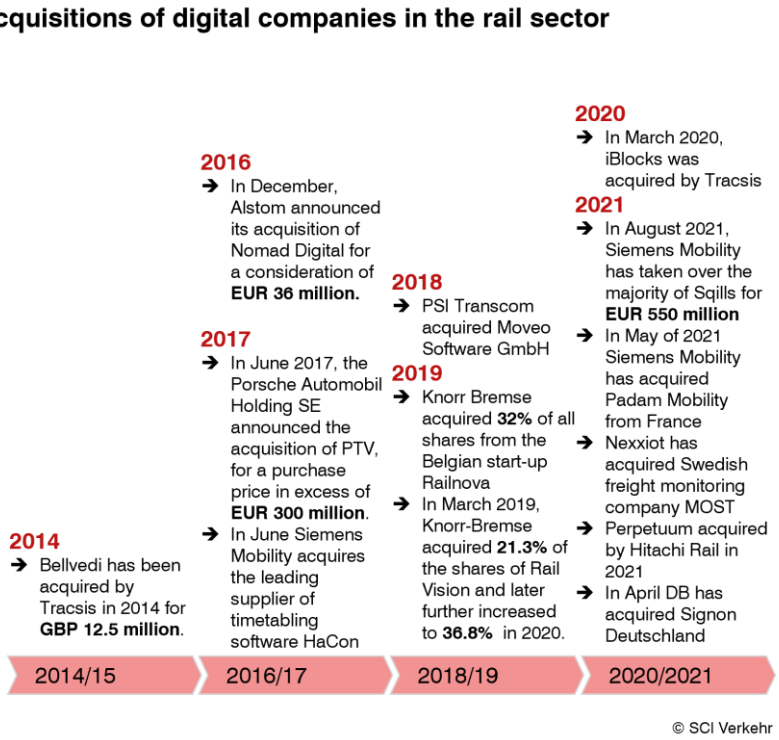


Figure 4: Acquisitions of digital companies in the European rail sector

The following section exemplifies the segmentation of SCI Verkehr.

Software applications for drivers

Although automatic driving of rolling stock on a wider scale is still rather uncommon, different solutions provide assistance to train drivers to streamline daily train operation. In compliance with timetables, these systems provide speed recommendations to drivers to reduce energy consumption of rolling stock. Likewise, in case of delays, train schedule reserves are being indicated and exploited.

Crisis/ incident management

A defined time schedule for train operation is prone to a multitude of risks, such as infrastructure or rolling stock failures, hazardous weather condition among others, disrupting scheduled operations. In the event of an incident digital solutions are available to analyse the situation and provide recommendations for control centres and dispatching personal. Given the reduced network autonomy of LRT systems with respect to conventional rail infrastructure, there are an increased risk of incidents such as parked cars and other congestions. This circumstance is taken into account with specific incident and crisis management software for LRT systems that usually also incorporate other modes of transport such as bus operation.

Often crisis/incident management solutions also comprise capabilities to analyse and assess the feasibility of connections in real time. Thereby, solutions automatically recognise arising conflicts and notifie respective personal that are able to take necessary decisions and actions. Either alternative connections are indicated or timetable adaptions are implemented at short notice.

Quality management tools

Generally, in Europe, regional rail bound transport services are predominantly awarded by public transport authorities within public service obligations (PSO). These tenders stipulate train services on certain routes depending on a given schedule. Upon the respective PSO operators must ensure punctuality, service quality and failures within a certain range. A variety of different software solutions in the market is offered, that monitors these figures and automatically reports them to PTAs and verifies the compliance with the respective PSO.

Telematics

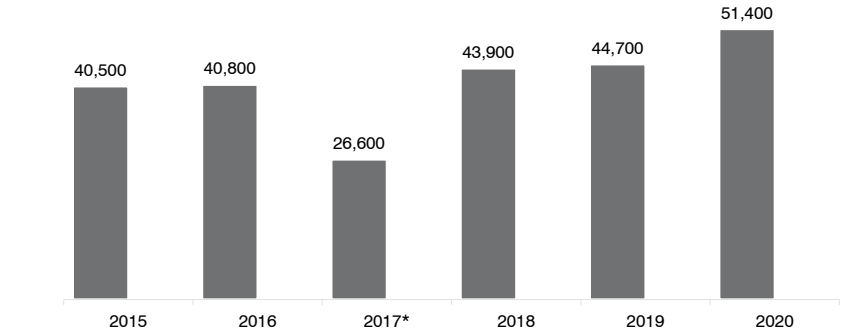
Within rail freight transport sector, the relevance of telematics systems has gained in importance throughout the past years. To ensure stability of operation and schedules, telematics systems are more and more employed to supervise cargo or the respective rolling stock. Generally, the employed software for installed sensors and receivers is less complex as it only displays, and analyses measured data.

Passenger counting systems

Within passenger transport market, offered services are constantly adapted to transport demand. Across all sectors, in particular within regional and urban services, operators have made efforts to examine transport passenger volumes for their planning processes with respect to employed rolling stock and personnel. Moreover, the determination of renumeration shares for public transport authorities and the controlling of public transport authorities with respect to operators can be another viable purpose for the installation of corresponding systems.

In the following SCI Verkehr provides exemplary views of a factsheet.

HaCon Ingenieursgesellschaft mbH

HaCon Ingenieursgesellschaft mbH	
Company Overview	
Headquarter	Lister Straße 15, 30163 Hannover, Germany, Tel: +49 511 336 99-0 www.hacon.de
Management	CEO: Michael Frankenberg
Year of foundation	1984
Development of revenue	**HaCon: Development of revenue** (EUR thousands)  Source: HaCon Ingenieursgesellschaft mbH © SCI Verkehr
Current Shareholders	Siemens Mobility (100%)

Tsd. EUR	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Revenue	40,500	40,800	26,600[1]	43,900	44,700	51,400
Net profit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	n.r.
Balance sheet total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	93,100
Employees	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	403

[1] reporting period changed during 2017

Digital solutions for operators							
Marketing / Sales / Order-management	Transport planning	Rolling stock disposition	Operation	Resource management	Maintenance rolling stock	Service customers	System solutions / New models
X	X	-	X	X	-	X	X

Digital solutions for infrastructure					
Allocation of capacity	Pricing and marketing of train paths	Traffic management and control	Network maintenance	Network modernisation	Planning and development of new capacity
X	-	-	X	X	-

Strategical focus of the company
HaCon develops software solutions for public transport operators and public transport authorities. The portfolio comprises solutions for rail operators in the fields of resource and operation management as well as passenger information systems. Regional core markets are in Europe, besides few references in Australia and the US. HaCon acquired Bytemark, Eos Uptrade and Padam, which are all part of the Siemens Family through HaCon. Bytemark is active in the North American market.

HaCon's digital solutions for railway		
Solutions	**Product name**	**Description**
Service Customers	HAFAS trip Planner	HaCon features door-to-door routing including all modes of transportation, real-time information and individual push notifications. In addition to buses, trains, trams, ferries and planes, HAFAS provides car, bicycle as well as pedestrian routing. As a platform for Mobility as a Service (MaaS), HAFAS allows intermodal trip planning and integrated ticketing.
Operation	HAFAS Information Manager	The solution provides passengers with information on deviations from the schedule as well as service alerts. HIM supports all possible communication channels. As a rule-based editor, HIM lets transit authorities ensure that disruptions are associated with the relevant services only. This includes the location, duration and nature of the disruption. Based on schedule and real-time situation, HIM will automatically detect which services are affected and only inform those passengers. Instead of a general broadcast message, HIM ensures targeted information is shared with the affected travellers only.
Resource management	HAFAS Smart VMS	HAFAS Smart VMS is a scalable vehicle management solution, which includes solutions for Rail Replacement Services. Available as a platform-independent driver app for smartphones, tablets or on-board computers, it gathers real-time data on the current locations of public transport vehicles, communicates with the control centre and transmits the data to various passenger information systems. It's fully web-based and enables any transit agency to receive accurate real-time data and CAD/AVL functionality. HAFAS Smart VMS assures collected data and verifies it against available schedules and routes. This allows transit operators to inform their passengers and to take further actions in order to improve their services.
Marketing / Sales / Order-management	HAFAS Time Machine	HAFAS Time Machine enables transport companies to determine in retrospect whether individual journeys of specific passengers were possible as scheduled. Especially with regards to the EU passenger rights and related compensation claims, the traceability of historical travel data is of importance. The HAFAS Time Machine maps the entire routing at the time of the trip – including the associated disruption information – and checks the complete travel chain for feasibility using the historical real-time data.
System Solution / new model	Mobility Data Analytics	Mobility Data Analytics provides data sources, including trip planning, ticketing, fleet management and intelligent infrastructure. This data allows public transport operators and rail infrastructure companies to understand passenger behaviour and improve public transport offerings. Big data offer detailed predictions of transport demand, automatic incident detection and quality evaluations regarding connections and First Mile/Last Mile solutions. Each transaction made in a mobility app creates data, such as a HAFAS-based trip planner.
Marketing, Customer Service	Traveler Relationship Manager (TRM)	Traveler Relationship Manager (TRM) helps operators to relate to their passengers, to meet their needs and to manage customer. Operators can use already existing apps or digital displays to capture the passenger's attention using banners, launch marketing campaigns, introduce surveys, discover new target groups among customers, approach focus groups and add location-based context to the communication channels.
Transport Planning,	TPS Plan	TPS Plan is specifically designed for transport companies that cooperate with network operators according to common standards in order to create their timetables. It allows them to access the current infrastructure database and check train path inquiries for current vehicle positions, construction areas and other factors. Due to integrated interfaces, schedules and operational processes are accessible.
Transport Planning Allocation of capacity	TPS Integrator	TPS Integrator is a tool used to integrate scheduling data across several public transport providers, closing the gap between planning timetables and providing integrated timetable data via the distribution systems. The software specialises in collecting and processing all timetable data and feeding harmonised data to customer information systems.
Operation	TPS Live	TPS Live has been developed specifically for ad-hoc train dispatching, that controls and optimises everyday rail operations. Short-term disruptions such as delays, broken shunting points or signalling systems can be processed in real time. TPS Live detects conflicts that have an impact on the entire railway network and offers automatic, semi-automatic, and manual conflict resolutions. As a result, dispatchers can respond to disturbances, for example by advising trains to wait for each other, by redirecting them or by scheduling a change of track.

Network maintenance / modernisation, Operation	TPS Track Works	TPS Track Works helps to reduce train disruptions and delays caused by track construction works. It enables users to manage all construction sites within their network using one single software. TPS Track Works supports in calculating anticipated delays and, as a multi-user application, provides all stakeholders with an integrated view of current projects – from employees to external contractors requesting network access. It features an intuitive GUI that facilitates an allocation of competencies as well as defining comprehensive workflows.

Company description

Company introduction

HaCon provides software solutions for public transportation, mobility and logistics. The HAFAS business unit provides MaaS-solutions and in addition a data and fleet management module. The product suite covers aspects from trip planning, passenger information systems, ticketing, and fleet management and creates the end user experience. HaCon's business unit TPS provides solutions for train planning and capacity management. Additionally, for more specialised projects, the consulting team offers customer-specific solutions for rail freight and combined transport. The MaaS solution – the Mobility Marketplace – creates travel experiences for passengers across all modes. The Mobility Marketplace allows combining different modes of transport to intermodal travel chains including public and private transport, on-demand services (DRT), road traffic information, car sharing providers, taxi, bike and pedestrian routing. Its task is to suggest the optimal combination of different options. Automatic best-price calculation at the end of the trip guarantees flexibility and comfort across all transport modes, beyond tariff zones. The solutions support public transit agencies (PTAs) and private transit operators (PTOs) worldwide.

Company history

HaCon was founded in 1984 by Marian Gaidzik, Werner Kretschmer and Volker Sustrate. The origin of the company goes back to the development of HAFAS, as the first nationwide timetable information system in Germany, launched by Deutsche Bundesbahn. Until today HAFAS is the centrepiece of DB Navigator. Over the years, HaCon expanded its portfolio with additional solutions e.g., for fleet or incident management. In 2017 HaCon became part of Siemens' mobility branch.

Current relevant company information

Besides new customers such as the Dutch joint venture RiVier or SBB, the latest acquisition of Padam Mobility from Paris, France by Siemens Mobility will have major impact for HaCon, as it allows to levy new synergies with Padam's Software as a Service (SaaS) solutions for on-demand and paratransit software solutions.

October 2021: Berliner Verkehrsbetriebe (BVG) has commissioned the two Siemens Mobility subsidiaries Hacon and eos.uptrade, as well as digital expert Ray Sono, to design, deliver, implement and operate the next generation of its journey information app as part of a Europe-wide tender.

Customers and references

HAFAS trip planner:

- Deutsche Bahn AG (DB) (DE, Berlin)
- DSB (DK, Copenhagen)
- Nederlandse Spoorwegen (NS), (NL, Utrecht)
- SNCB (BE, Brussels)
- SNCF (FR, Paris)
- Trenitalia (IT, Rome)
- Eurostar International Ltd. (UK, London)
- Berliner Verkehrsbetriebe (BVG) (DE, Berlin)
- Verkehrsverbund Rhein Ruhr (VRR), (DE, Gelsenkirchen)

HAFAS Information Manager:

- Deutsche Bahn AG (DB) (DE, Berlin)
- DB Regio (Germany)
- ÖBB (AT, Vienna)
- SBB (CH; Bern)
- CFL (LU, Luxembourg)
- SNCB/NMBS (BE, Brussels)
- BART (USA, San Francisco)
- Cap Metro (USA, Austin)
- DSB (DK, Copenhagen)

HAFAS Smart VMS:

- DB Regio (DE, Frankfurt)
- Trafikvörvaltningen (SE, Stockholm)
- PostAuto (CH, Bern)
- POSTBUS (Austria)
- Rejseplanen (Denmark)
- SNCF (FR, Paris)
- Fintraffic (Finland)

HAFAS Time Machine:

- SBB (CH, Bern)

Demand Responsive Transport (DRT):

- Ile de France Mobilités (FR, Paris)
- CTS (FR, Strasbourg)
- Keolis (FR, Lille and Orléans)
- STCL (FR, Limoges)
- DB Regio (DE)
- Busitalia Veneto (IT, Venetia)
- Lincolnshire County Council (UK)
- Celering (ES, Madrid)

Mobile Data Analytics:

- RMV (DE, Frankfurt)
- VAO (AT, Vienna)
- VBZ (CH, Zurich)

Traveler Relationship Manager (TRM):

- Berliner Verkehrsbetriebe (BVG) (DE, Berlin)
- VAO (AT, Vienna)

TPS Plan:

- Deutsche Bahn (DB), (DE, Berlin) Transport (BT) (DE, Berlin)
- DB Cargo, (DE, Mainz)

Customers and references
– DSB, (DK, Copenhagen) – Iarnród Éireann, (IR, Dublin) – SNCF, (FR, Paris) – SNCF Réseau, (FR, Paris) **TPS Integrator:** – DB AG (DE, Frankfurt) – ÖBB (AT, Vienna) – SBB (CH, Bern) – NS (NL, Utrecht) – SNCB (BE, Brussels) – SNCF (FR, Paris) **TPS Live:** – CSX Corportaion (US) – Fintraffic (Finland) – DSB (DK, Copenhagen) **TPS Track Works:** – DB Netz (DE, Frankfurt)